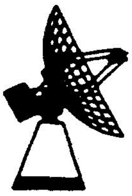
NEC

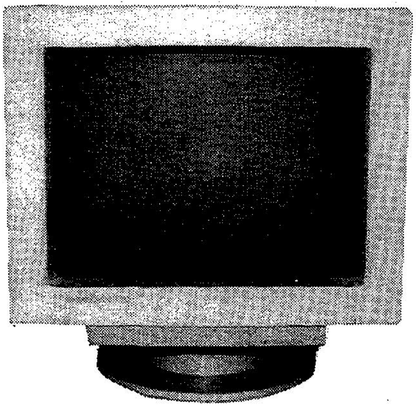
MODELS JC-1404HME/EE/R /ED

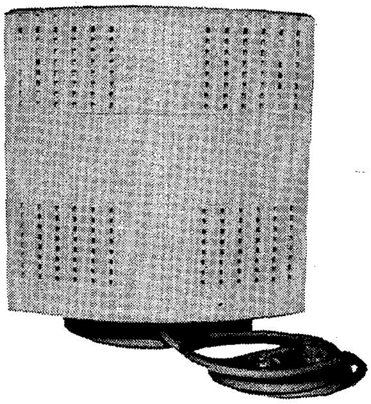
COLOR MONITOR MultiSync 3D
SERVICE MANUAL

PARTS NO. 599910285



Better Service
Better Reputation
Better Profit





SPECIFICATIONS

A. Electrical Description

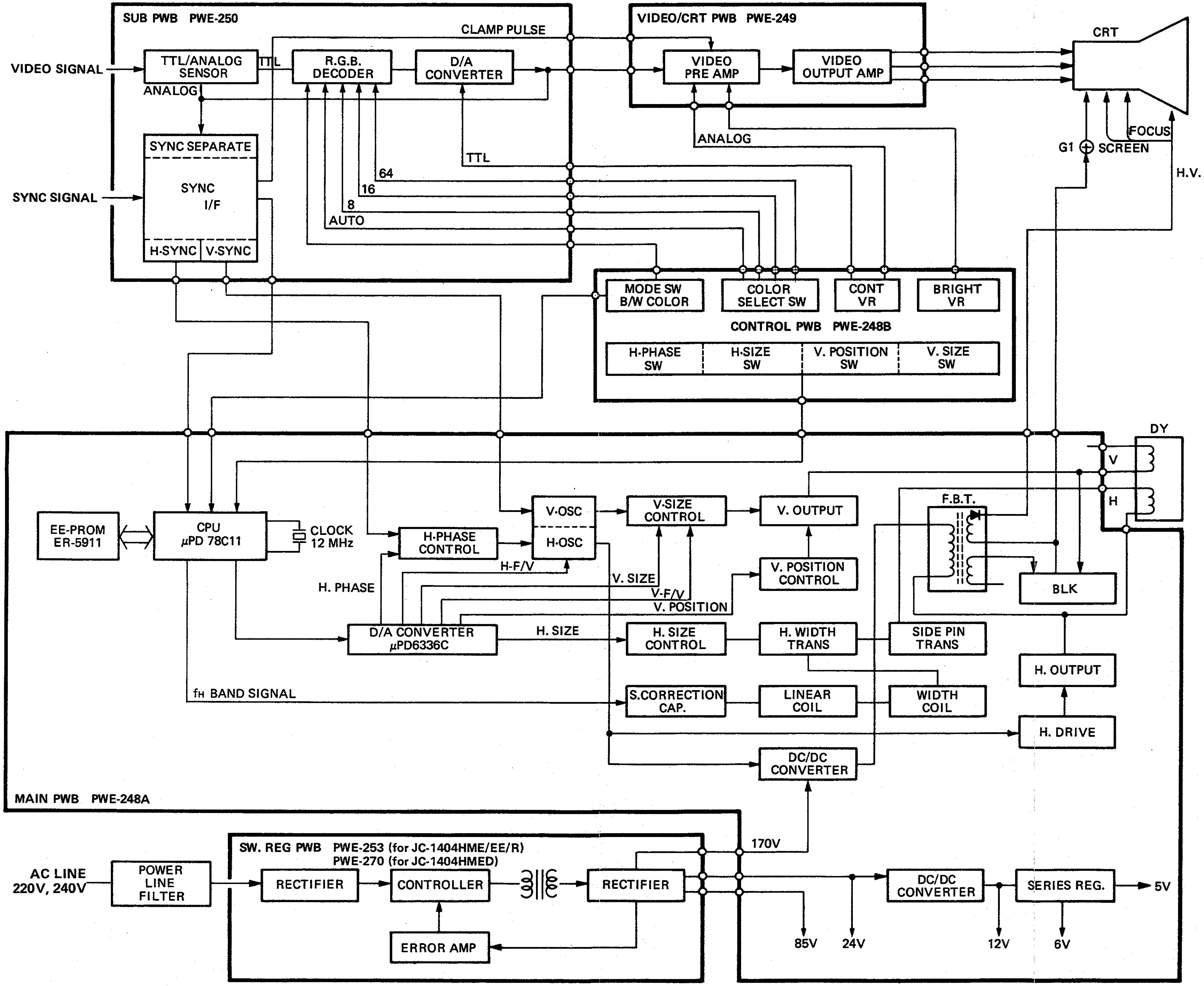
Picture Tube	13 Visual inches diagonal 90 degree deflection, 0.28mm dot pitch Dot type black matrix, Not-long persistence phosphor, Dark bulb, Direct etch
Input Signal	Video: TTL Level Positive : ANALOG 0.7 Vp-p/75Ω Positive Sync.: Separate sync. TTL Level Horizontal sync. Positive/Negative Vertical sync. Positive/Negative : Composite sync. TTL Level Positive/Negative : Composite sync. on Green Video sync. 0.3Vp-p Negative (Video 0.7Vp-p Positive)
Display Colors	TTL Input: 8/16/64 colors Analog Input: Unlimited colors

Synchronization	Horizontal: 15.5 kHz to 38 kHz (Automatically) Vertical: 50 Hz to 90 Hz (Automatically)
Resolution	Horizontal: 1024 dots Vertical: 768 lines (interlaced)
Video Band Width	45 MHz
Active Display Area	Horizontal: 240mm Vertical: 180mm (Active display area is changed by signal timing.)
Misconvergence	Less than 0.6mm
Power Supply	AC 220V, 240V 50/60 Hz
Power Consumption	82W
Environmental Considerations	Operating Temperature 0° to +40°C Humidity 30% to 80% Storage Temperature −20°C to +60°C Humidity 10% to 90%

NOTE: The above specifications are subject to change without notice for further improvement.

NEC Corporation
TOKYO, JAPAN

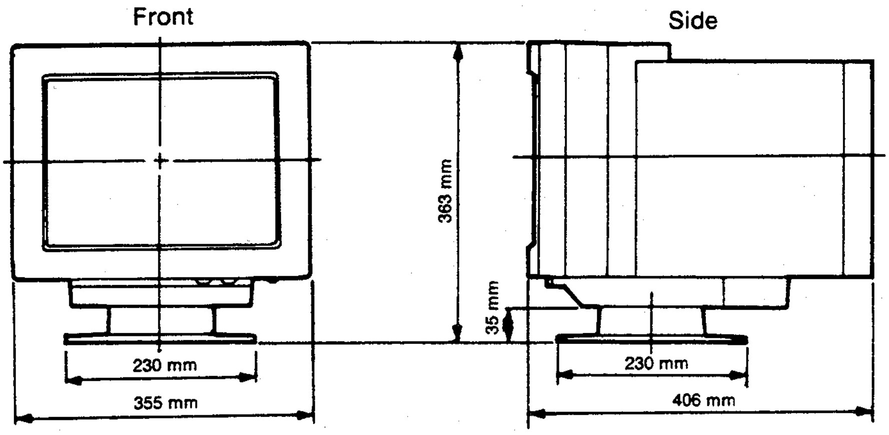
BLOCKDIAGRAM


SUB PWB PWE-250
VIDEO SIGNAL
TTL/ANALOG SENSOR
TTL
ANALOG
R.G.B. DECODER
D/A CONVERTER
CLAMP PULSE
SYNC SIGNAL
SYNC SEPARATE
SYNC I/F
H-SYNC
V-SYNC
64
16
8
AUTO
TTL
VIDEO/CRT PWB PWE-249
VIDEO PRE AMP
VIDEO OUTPUT AMP
ANALOG
CRT
FOCUS
G1
SCREEN
H.V.
MODE SW B/W COLOR
COLOR SELECT SW
CONT VR
BRIGHT VR
CONTROL PWB PWE-248B
H-PHASE SW
H-SIZE SW
V. POSITION SW
V. SIZE SW
DY
V
H
EE-PROM ER-5911
CPU µPD 78C11
CLOCK 12 MHz
H-PHASE CONTROL
V-OSC
H-OSC
H-F/V
H. PHASE
V. SIZE
V-F/V
V. POSITION
V-SIZE CONTROL
V. OUTPUT
V. POSITION CONTROL
F.B.T.
BLK
D/A CONVERTER µPD6336C
H. SIZE
H. SIZE CONTROL
H. WIDTH TRANS
SIDE PIN TRANS
H. OUTPUT
fH BAND SIGNAL
S.CORRECTION CAP.
LINEAR COIL
WIDTH COIL
H. DRIVE
DC/DC CONVERTER
MAIN PWB PWE-248A
SW. REG PWB PWE-253 (for JC-1404HME/EE/R)
PWE-270 (for JC-1404HMED)
AC LINE 220V, 240V
POWER LINE FILTER
RECTIFIER
CONTROLLER
RECTIFIER
ERROR AMP
170V
DC/DC CONVERTER
SERIES REG.
5V
85V
24V
12V
6V

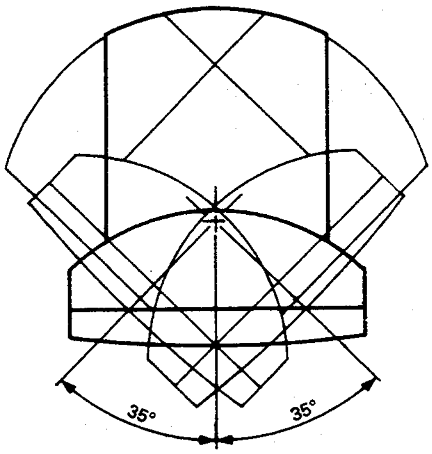
B. Mechanical Description (See below diagrams)

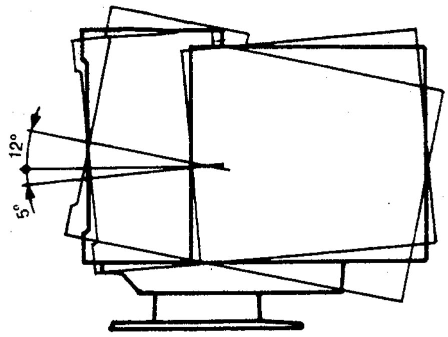
1. Cabinet: Molded plastic cabinet with detachable tilt swivel base.

2. Dimensions: 355(W) × 363(H) × 406(D) mm


Front
Side
363 mm
35 mm
230 mm
355 mm
230 mm
406 mm

3. Tilt Swivel Range





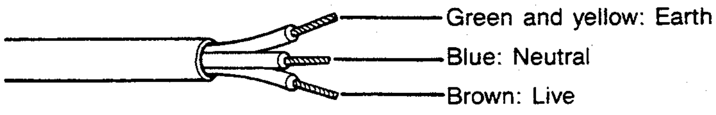
4. Weight: 16 kg

5. Controls:

POWER SWITCH
BRIGHTNESS CONTROL
CONTRAST CONTROL
COLOR SWITCH
MODE SWITCH
H. SIZE CONTROL
H. POSITION CONTROL
V. SIZE CONTROL
V. POSITION CONTROL
MEMORY RECALL BUTTON

6. Input Signal Terminal: 15 PIN MINI D-SUB CONNECTOR (MALE)
(SEE PAGE 6 FOR PIN ASSIGNMENTS)

7. Power cord
In case of JC-1404HMEE, the end of power cord is as follows.


Green and yellow: Earth
Blue: Neutral
Brown: Live

GENERAL

The MultiSync 3D Color Monitor, an Intelligent Monitor from NEC, is a microprocessor based, digital controlled multiple frequency Color Monitor. The MultiSync 3D Color Monitor automatically adjusts to graphics adapter scanning frequencies between 15.5 kHz and 38 kHz (Horizontal), and between 50 Hz and 90 Hz (Vertical).

As you can see, "design" was the top priority with the MultiSync 3D Color Monitor. Besides the dramatic cabinet design, the MultiSync 3D Color Monitor was designed with microprocessor based intelligence, allowing it to operate at each mode with the precision of a fixed frequency monitor.

The MultiSync 3D Color Monitor gives IBM PC, PC/XT, PC/AT, Personal System/2 (PS/2), Apple Macintosh II and compatible users crisp text and vivid color graphics displays when using the following graphics adapters (the MDA, CGA, EGA, PGC, MCGA, VGA and 8514/A) and Apple Macintosh II Video Card.

The MultiSync 3D Color Monitor can also be used with other "non-standard" graphics adapters to provide users with an extremely wide range of color monitor compatibility.

FEATURES

— The MultiSync 3D Color Monitor is microprocessor controlled with a resident memory base of pre-programmed screen and input configurations and also digital controls.

— The MultiSync 3D Color Monitor automatically scans all horizontal frequencies between 15.5 kHz and 38 kHz, and all vertical frequencies between 50 Hz and 90 Hz.

— The MultiSync 3D Color Monitor is compatible with the IBM PC, PC/XT, PC/AT, PS/2, the Apple Macintosh II and compatibles.

— The MultiSync 3D Color Monitor is compatible with the IBM Monochrome Display Adapter, the IBM Color Graphics Adapter, the IBM Enhanced Graphics Adapter, the IBM Professional Graphics Controller, the IBM MultiColor Graphics Array, the IBM Video Graphics Array, the IBM 8514/A, the Apple Macintosh II Video Card and other compatible graphics adapters.

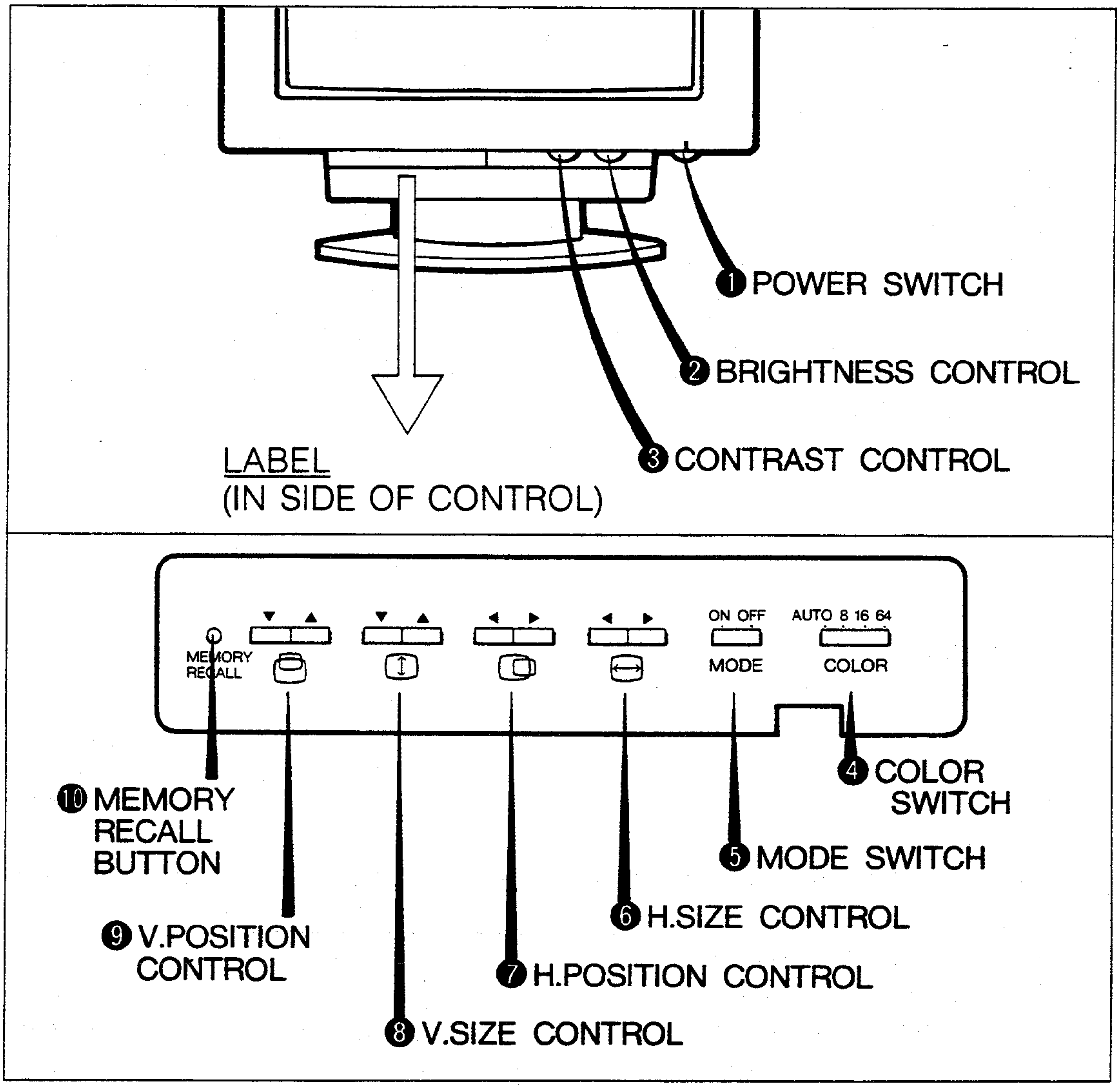
— The MultiSync 3D Color Monitor's wide compatibility makes it possible to upgrade adapters or software without purchasing a new monitor.
— The MultiSync 3D Color Monitor has a maximum horizontal resolution of 1024 dots and a maximum vertical resolution of 768 lines for superior clarity of display.
— The MultiSync 3D Color Monitor offers both TTL and ANALOG signal inputs, and in the ANALOG mode can display an unlimited palette of colors depending on the graphics adapter and software being used. The MultiSync 3D Color Monitor automatically adjust to either a TTL signalinput or an ANALOG signalinput.
— The MultiSync 3D Color Monitor has a 14″ diagonally measured, non-glare CRT that yields a 13″ viewing area.
— A captive signal cable is included with a 15 Pin mini D-sub connector that is configured for IBM's MCGA, VGA and 8514/A graphics adapters.
— Signal cable adapters for graphics adapters with 9 Pin D-sub connector and Macintosh II Video Card are included.

CAUTIONS

When setting up and using your MultiSync 3D Color Monitor, pay special attention to the following:

— To eliminate eye fatigue, do not use your MultiSync 3D Color Monitor against a bright background or where sunlight or other light sources will shine directly on the monitor.
— Your MultiSync 3D Color Monitor should be placed just below eye level for optimum viewing.
— Allow adequate ventilation around the monitor so that heat from the monitor can properly dissipate.
— Neither the monitor itself, not any other heavy object, should rest on the power cord. Damage to a power cord can cause fire or electrical shock.
— Keep the monitor away from high capacity transformers, electric motors and other strong magnetic fields.
— Your MultiSync 3D Color Monitor should not be used in damp, dusty or dirty areas.
— Handle your MultiSync 3D Color Monitor with care when transporting it

ADJUSTING THE FRONT CONTROLS


① POWER SWITCH
② BRIGHTNESS CONTROL
③ CONTRAST CONTROL
LABEL
(IN SIDE OF CONTROL)
MEMORY RECALL
MODE
COLOR
ON OFF
AUTO 8 16 64
④ COLOR SWITCH
⑤ MODE SWITCH
⑥ H.SIZE CONTROL
⑦ H.POSITION CONTROL
⑧ V.SIZE CONTROL
⑨ V.POSITION CONTROL
⑩ MEMORY RECALL BUTTON

❶ POWER SWITCH

Used to turn the power ON or OFF. When the power is ON, the LED power indicator, located on the front of the monitor, is lit.

❷ BRIGHTNESS CONTROL

Used to adjust the display's brightness preferred by the user.

❸ CONTRAST CONTROL

Used to adjust display's contrast preferred by the user.

❹ COLOR SWITCH

When the monitor receives a TTL color video signal, one of the four color configurations (AUTO, 8, 16, 64) must be selected.

COLOR SWITCH	COLOR MODE
Auto	IBM CGA, EGA or Compatible Graphics adapter
8	8 Colors
16	16 Colors with IBM Brown
64	64 Colors

This switch works with preset TTL modes that the monitor identifies automatically.

❺ MODE SWITCH

This switch selects either the monochrome mode or color mode with a TTL video signal input.

With an Analog video signal input and MODE SWITCH ON, the monitor will give the user an additional user programmable memory area.

MODE SWITCH	Input Video Signal	MODE
OFF	TTL	General Color Mode (CGA, EGA)
	ANALOG	General Analog Mode (VGA, PGC, etc)
ON	TTL	Monochrome Mode (MDA)
	ANALOG	User Programmable Memory Area

For more detail, see the signal identification flowchart.

❻ H. SIZE CONTROL

Adjust these controls for the preferred horizontal size of the display

❼ H. POSITION CONTROL

Adjust these controls for the proper horizontal position of the display.

❽ V. SIZE CONTROL

Adjust these controls for the vertical size of display preferred.

❾ V. POSITION CONTROL

Adjust these controls for the proper vertical position of the display.

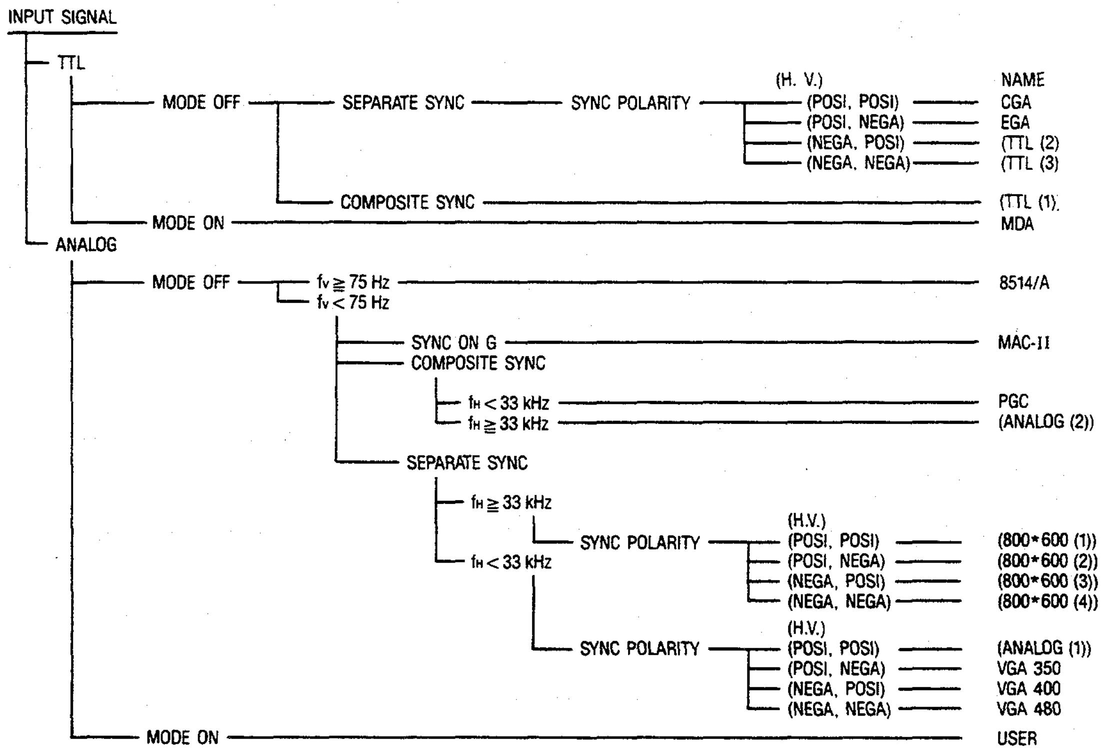
A few seconds after the user adjust the size and/or the position, the monitor's CPU will save the new control data into it's memory automatically.

NOTE: The monitor will display the screen configuration that was saved last.

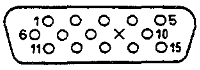
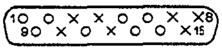
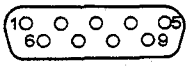
❿ MEMORY RECALL BUTTON

This button resets the data of user changeable memory and recalls the factory preset data.

SIGNAL IDENTIFICATION FLOWCHART


INPUT SIGNAL
TTL
MODE OFF
SEPARATE SYNC
SYNC POLARITY
(H. V.)
(POSI, POSI)
(POSI, NEGA)
(NEGA, POSI)
(NEGA, NEGA)
NAME
CGA
EGA
(TTL (2)
(TTL (3)
COMPOSITE SYNC
(TTL (1)
MODE ON
MDA
ANALOG
MODE OFF
fv ≧ 75 Hz
fv < 75 Hz
8514/A
SYNC ON G
MAC-II
COMPOSITE SYNC
fH < 33 kHz
fH ≧ 33 kHz
PGC
(ANALOG (2))
SEPARATE SYNC
fH ≧ 33 kHz
fH < 33 kHz
SYNC POLARITY
(H.V.)
(POSI, POSI)
(POSI, NEGA)
(NEGA, POSI)
(NEGA, NEGA)
(800*600 (1))
(800*600 (2))
(800*600 (3))
(800*600 (4))
SYNC POLARITY
(H.V.)
(POSI, POSI)
(POSI, NEGA)
(NEGA, POSI)
(NEGA, NEGA)
(ANALOG (1))
VGA 350
VGA 400
VGA 480
MODE ON
USER

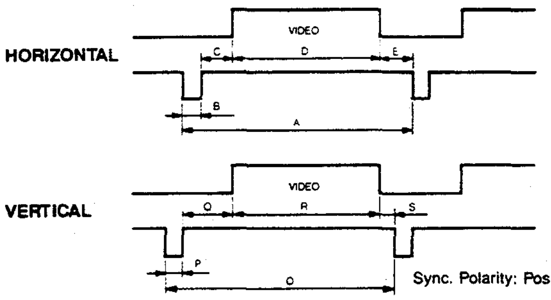
PIN ASSIGNMENTS

	 ***15 pin mini D-sub male**	 ****15 pin D-sub male**	 *****9 pin D-sub male**			
			IBM MDA	**IBM CGA**	**IBM EGA**	**IBM PGC**
1	RED VIDEO	RED GROUND	GROUND	GROUND	GROUND	RED
2	GREEN VIDEO	RED	NO-CONNECTION	GROUND	SECONDARY RED	GREEN
3	BLUE VIDEO	NO-CONNECTION	NO-CONNECTION	RED	PRIMARY RED	BLUE
4	GROUND	NO-CONNECTION	NO-CONNECTION	GREEN	PRIMARY GREEN	COMPOSITE SYNC
5	GROUND	GREEN WITH SYNC	NO-CONNECTION	BLUE	PRIMARY BLUE	NO-CONNECTION
6	RED GROUND	GREEN GROUND	INTENSITY	INTENSITY	SECONDARY GREEN	RED GROUND
7	GREEN GROUND	NO-CONNECTION	VIDEO	NO-CONNECTION	SECONDARY BLUE	GREEN GROUND
8	BLUE GROUND	NO-CONNECTION	H. SYNC	H. SYNC	H. SYNC	BLUE GROUND
9	NO-CONNECTION	BLUE	V. SYNC	V. SYNC	V. SYNC	GROUND
10	GROUND	NO-CONNECTION				
11	GROUND	GROUND				
12	NO-CONNECTION	NO-CONNECTION				
13	H. SYNC	BLUE GROUND				
14	V. SYNC	GROUND				
15	NO-CONNECTION	NO-CONNECTION				

*15 Pin mini D-sub male connector is on the captive signal cable, for use with the IBM VGA, 8514/A or compatible graphics adapters.
**15 Pin D-sub male connector is on the 15 Pin mini to 15 Pin D-sub adapter, for use with the Apple Macintosh II Video Card.
***9 Pin D-sub male connector is on the 15 Pin mini to 9 Pin D-sub adapter, for use with the IBM MDA, CGA, EGA, PGC or compatible graphics adapters.

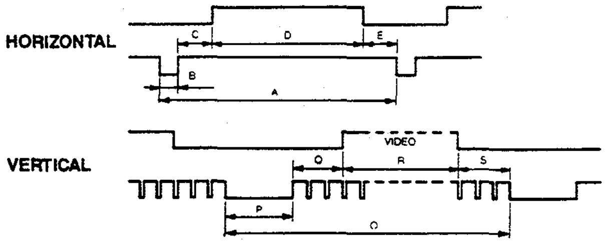
TIMING CHARTS

SEPARATE SYNC.


HORIZONTAL
VIDEO
C
D
E
B
A
VERTICAL
VIDEO
Q
R
S
P
O

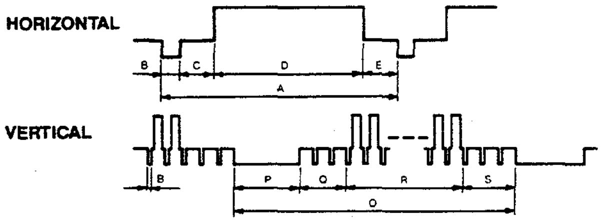
Sync. Polarity: Positive/Negative

COMPOSITE SYNC.


HORIZONTAL
C
D
E
B
A
VERTICAL
VIDEO
Q
R
S
P
O

Sync. Polarity: Positive/Negative

COMPOSITE SYNC. & VIDEO (SYNC. ON GREEN)

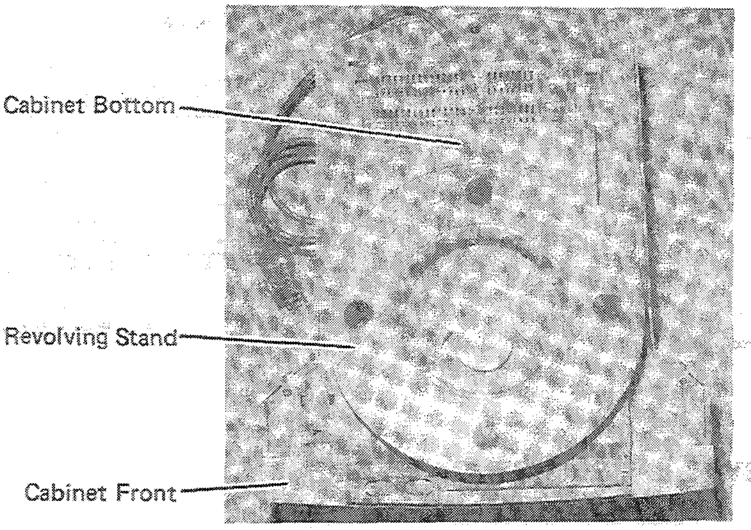

HORIZONTAL
B
C
D
E
A
VERTICAL
B
P
Q
R
S
O

Sync. Polarity: Negative

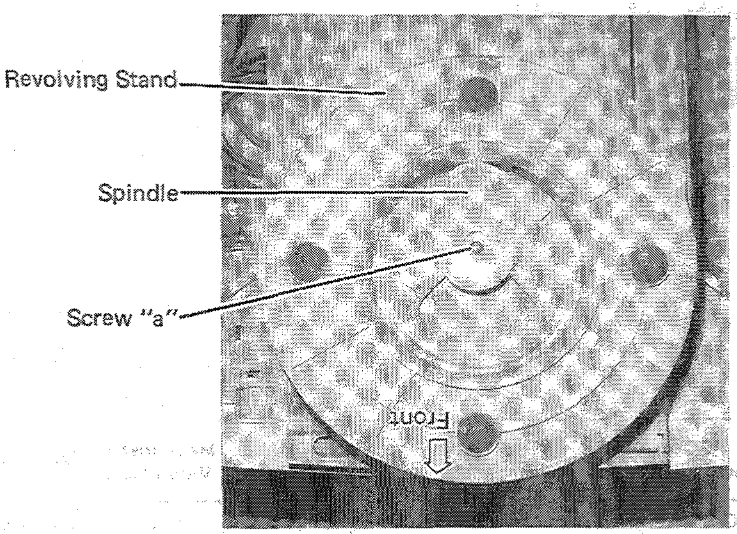
PRESET TIMING

	MDA Compatible	CGA Compatible	EGA Compatible	PGC Compatible	VGA/MCGA Compatible			8514/A Compatible	Macintosh Ⅱ Video Card	800 × 600
f_H	18.43 kHz	15.85 kHz	22 kHz	30.48 kHz	31.47kHz			35.52 kHz	35 kHz	35.16 kHz
$A_{\mu s}$	54.3	63	45.5	33	31.78			28.15	28.57	28.44
$B_{\mu s}$	8.3	4.2	4.9	4.5	3.81			3.92	2.1	2
$C_{\mu s}$	1.1	7.2	1.6	2.8	1.91			1.25	3.2	3.56
$D_{\mu s}$	44.3	45	39	25.6	25.42			22.8	21.5	22.22
$E_{\mu s}$	0.6	6.6	0	0.1	0.64			0.18	2.1	0.67
f_V	50 Hz	60.5Hz	60 Hz	60 Hz	70.08Hz		59.95Hz	87 Hz	67 Hz	56 Hz
O_{ms}	20.1	16.52	16.68	16.6	14.27	14.27	16.68	11.5	15	17.78
P_{ms}	0.9	0.19	0.6	0.07	0.06	0.06	0.06	0.113	0.086	0.06
Q_{ms}	0.2	2.15	0.08	2.12	1.91	1.11	1.05	0.563	1.12	0.63
R_{ms}	19.0	12.6	16	13.05	11.12	12.71	15.25	10.81	13.7	17.07
S_{ms}	0	1.58	0	1.36	1.18	0.38	0.32	0.014	0.086	0.03
Remarks	TTL Video	TTL Video	TTL Video	Analog Video	Analog Video	Analog Video	Analog Video	Analog Video Interlace	Analog Video	Analog Video

THE METHOD FOR REMOVING THE TILT SWIVEL BASE

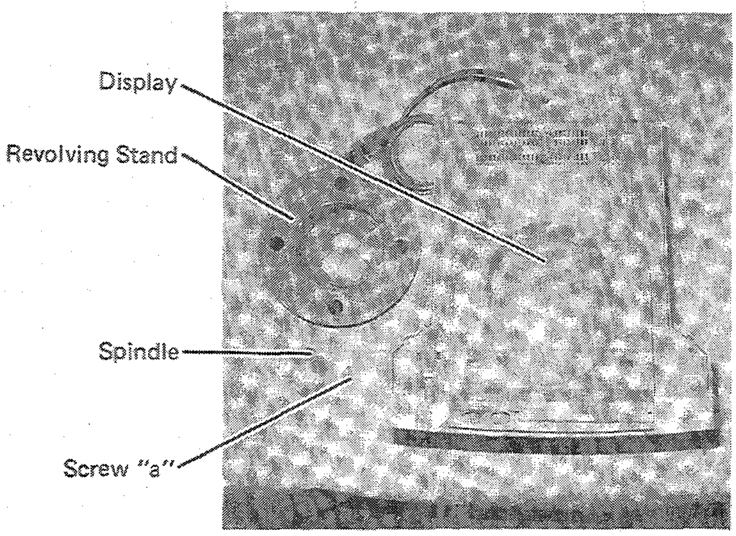

Cabinet Bottom
Revolving Stand
Cabinet Front

1. Turn the monitor set upside down as shown. (Top VIEW)


Revolving Stand
Spindle
Screw "a"
Front

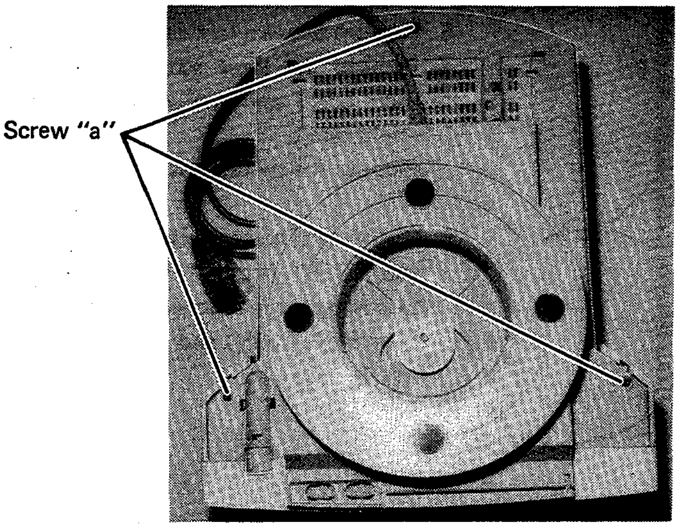
2. Move the revolving stand so that a "⇧FRONT" mark comes to the cabinet front side.

3. Remove the Screw "a", then remove both spindle and revolving stand from the display.


Display
Revolving Stand
Spindle
Screw "a"

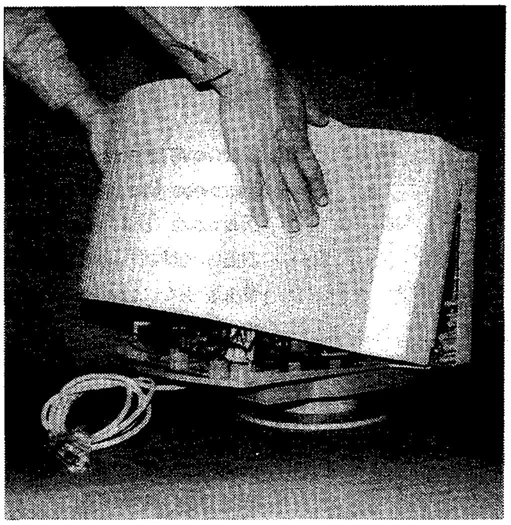
4. The removed parts consist of a display, revolving stand, spindle and screw "a" as shown.

DISASSEMBLY

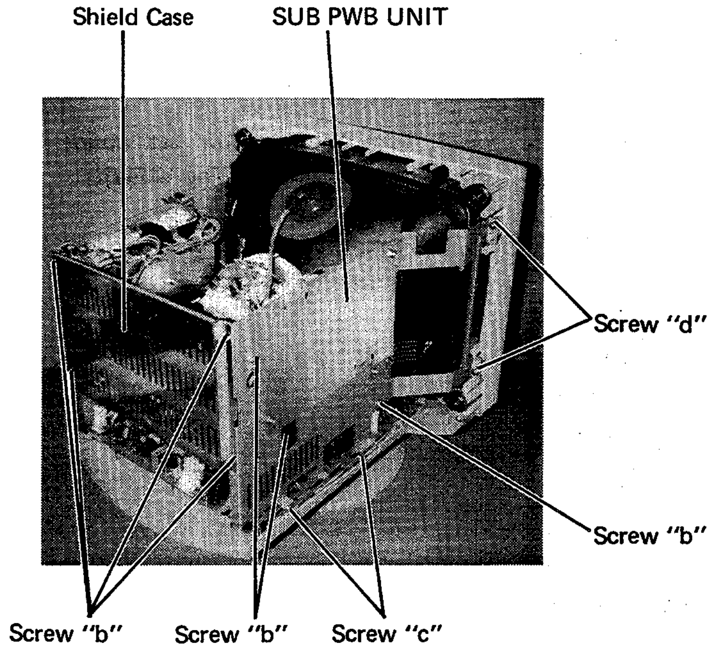


1. Turn the monitor set upside down as shown. (Top VIEW)

2. Remove three screws "a" from the cabinet bottom.



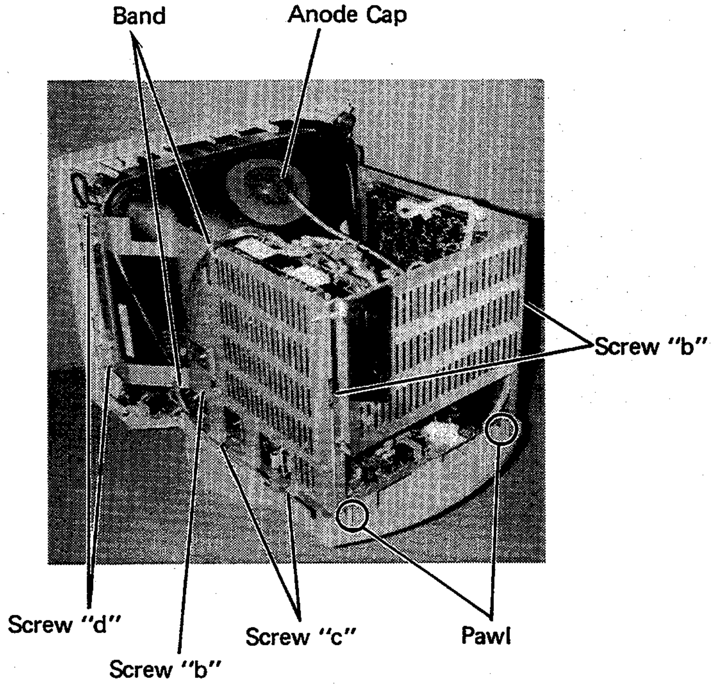
3. Invert the monitor set as normal, then remove the cabinet back.


Shield Case
SUB PWB UNIT
Screw "d"
Screw "b"
Screw "b"
Screw "b"
Screw "c"

4. Remove the four screws "b" the shield case and remove the shield case.

5. Remove the two screws "c".
   Remove the three screws "b" of the SUB PWB UNIT and the screw "b" (under the shield case).
   Remove the two screws "d".

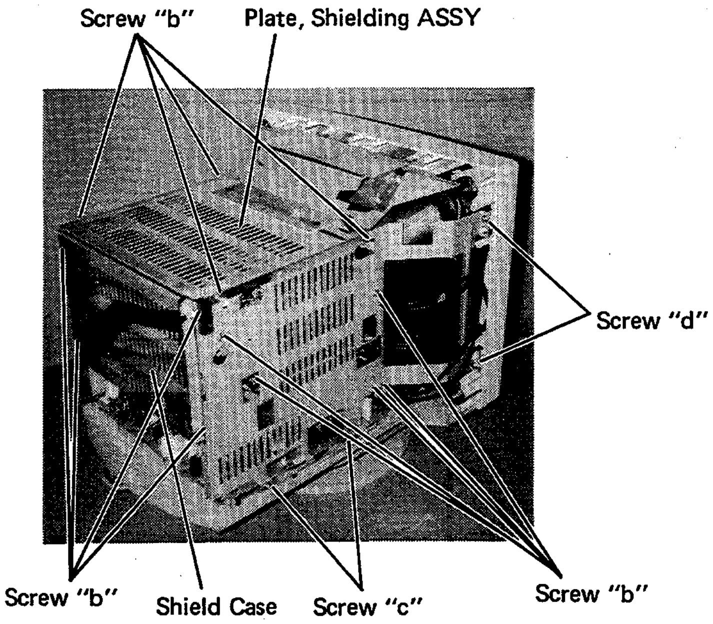
6. Disconnect the connectors "CN-A", "CN-M" and "CN-S". (from SUB PWB UNIT).
   Disconnect the connectors "CN-V" (from CRT PWB ASSY) and lift up the SUB PWB UNIT.


Band
Anode Cap
Screw "b"
Screw "d"
Screw "b"
Screw "c"
Pawl

7. Remove the two screws "c".
   Remove the two screws "d".
   Remove the two screws "b" of the SW. REG. UNIT and the two screws "b" (under the shield case).

8. Disconnect the connector "CN-K" (from MAIN PWB ASSY).
   Cut the two bands and disconnect the connectors "CN-SW" and "CN-Z" (from SW.REG. UNIT).
   Lift up the SW. REG. UNIT.

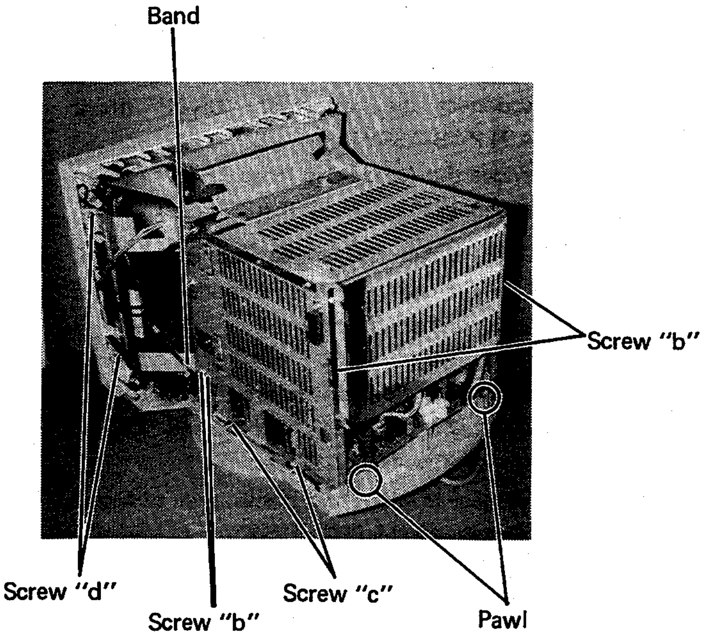
As for model JC-1404HMED


Screw "b"
Plate, Shielding ASSY
Screw "d"
Screw "b"
Shield Case
Screw "c"
Screw "b"

4′. Remove the four screws "b" of the plate, shielding ASSY and remove the plate, shielding ASSY.
Remove the four screws "b" of the shield case and remove the shield case.

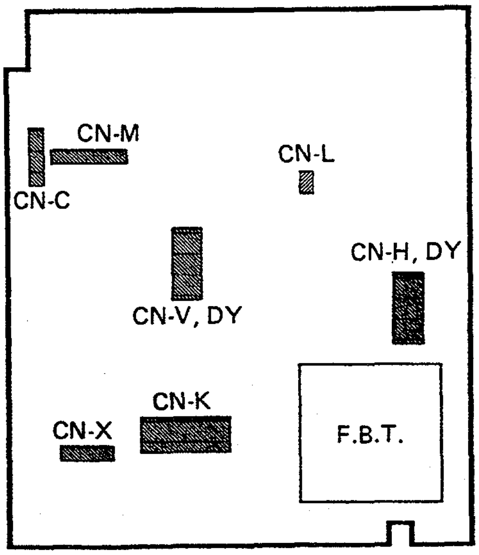
5′. Remove the two screws "c".
Remove the five screws "b" of the SUB PWB UNIT and the screw "b" (under the shield case).

6′. Disconnect the connectors "CN-A", "CN-M" and "CN-S" (from SUB PWB UNIT).
Disconnect the connectors "CN-V" (from CRT PWB ASSY) and lift up the SUB PWB UNIT.

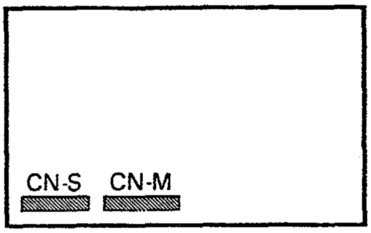

Band
Screw "b"
Screw "d"
Screw "b"
Screw "c"
Pawl

7′. Remove the two screws "c".
Remove the two screws "d".
Remove the two screws "b" of the SW. REG. UNIT and the two screws "b" (under the shield case).

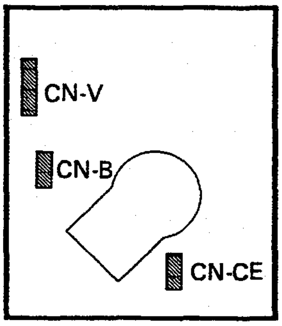
8′. Disconnect the connector "CN-K" (from MAIN PWB ASSY).
Cut the band and disconnect the connectors "CN-SW" and "CN-Z" (from SW. REG. UNIT).
Lift up the SW. REG. UNIT.


CN-M
CN-L
CN-C
CN-H, DY
CN-V, DY
CN-K
CN-X
F.B.T.

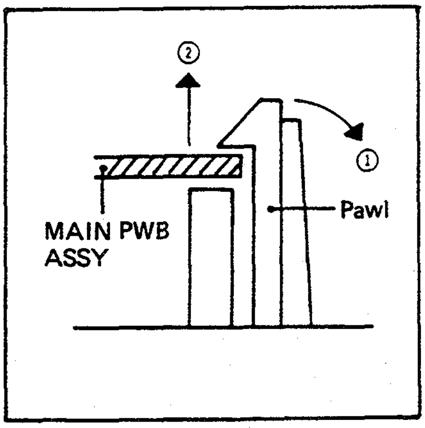
MAIN PWB



SUB PWB


CN-V
CN-B
CN-CE

CRT PWB

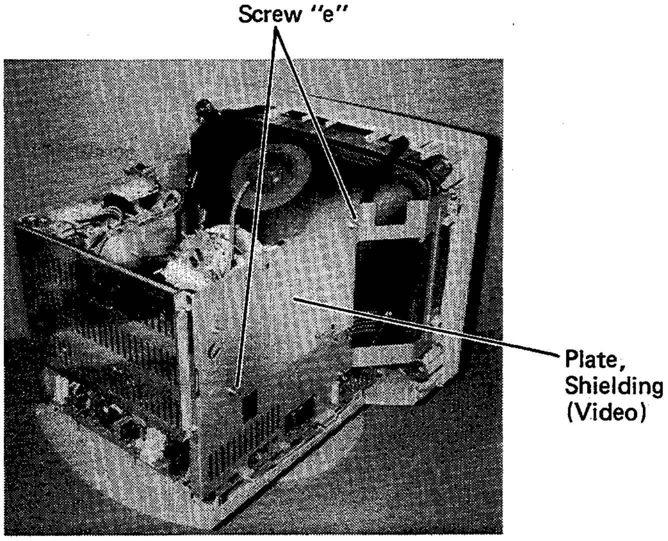

②
①
Pawl
MAIN PWB ASSY

9. Disconnect the connector "CN-B" and "CN-CE" (from CRT PWB ASSY).
   Disconnect the connector "CN-X" (from MAIN PWB ASSY).
   Remove the Anode Cap from CRT.
   Disconnect the CRT PWB ASSY.

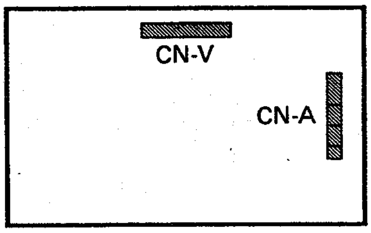
   NOTE: When the anode cap is removed, shorting the CRT's anode to ground before touch it.

10. Disconnect the Connectors "CN-H, DY", "CN-V, DY", "CN-C", "CN-M" and "CN-L" (from MAIN PWB ASSY).
    Disengage pawls at two places, then slide and lift up the MAIN PWB ASSY.

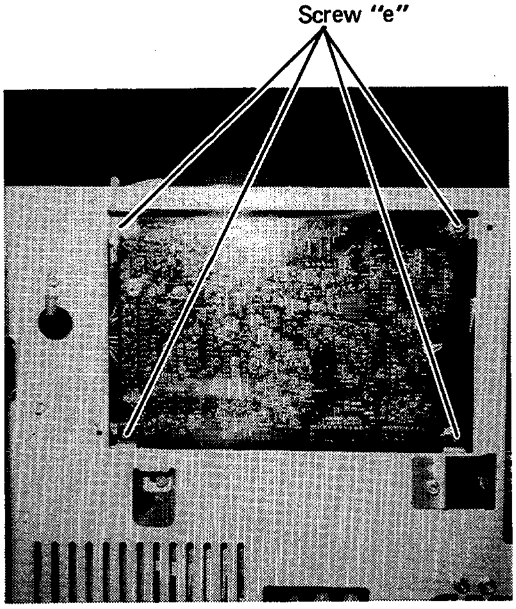
SUB PWB UNIT DISASSEMBLY


Screw "e"
Plate,
Shielding
(Video)

1. Remove the two screws "e" and the plate, shielding (Video).
   Disconnect the connectors "CN-V" and "CN-A" (from SUB PWB UNIT).

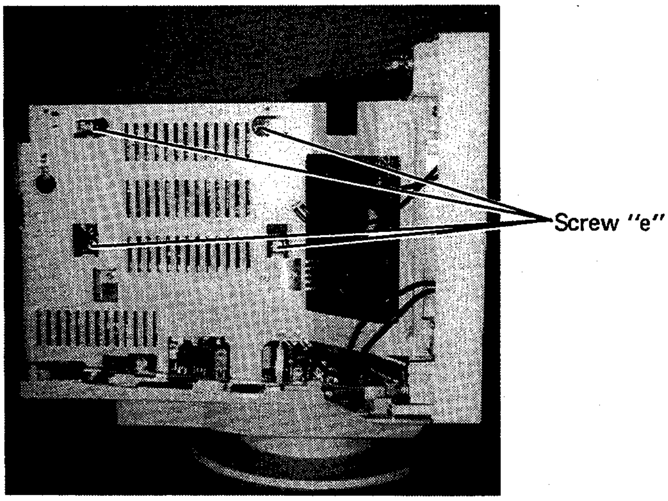


SUB PWB UNIT



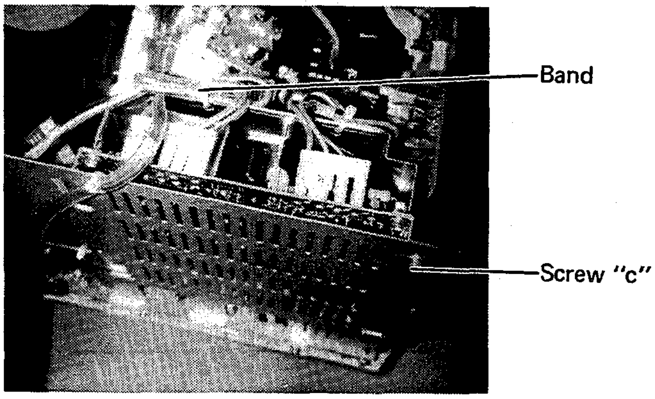
2. Remove the four screws "e".
   Lift up the SUB PWB UNIT.

As for model JC-1404HMED



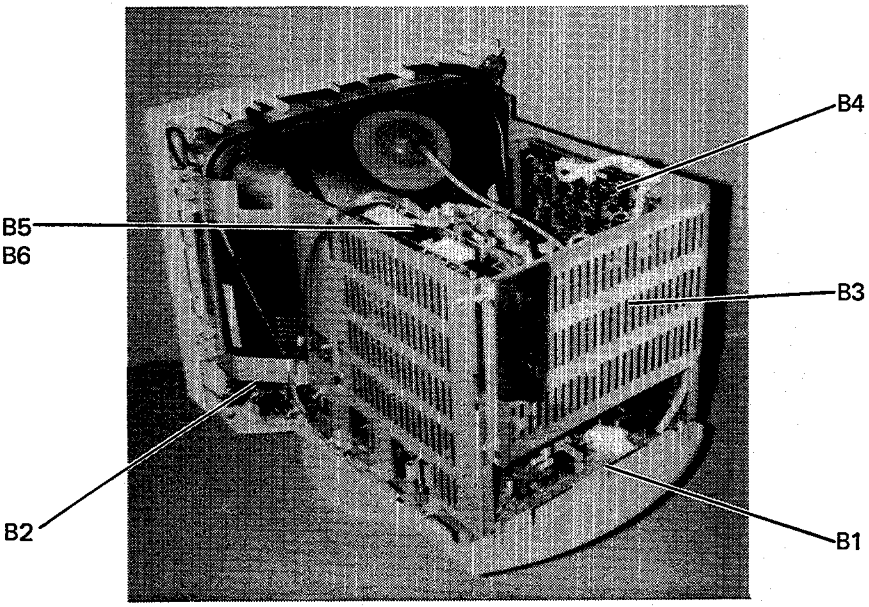
1'. Remove the four screws "e".
Lift up the SUB PWB UNIT.

SW. REG. UNIT DISASSEMBLY


Band
Screw "c"

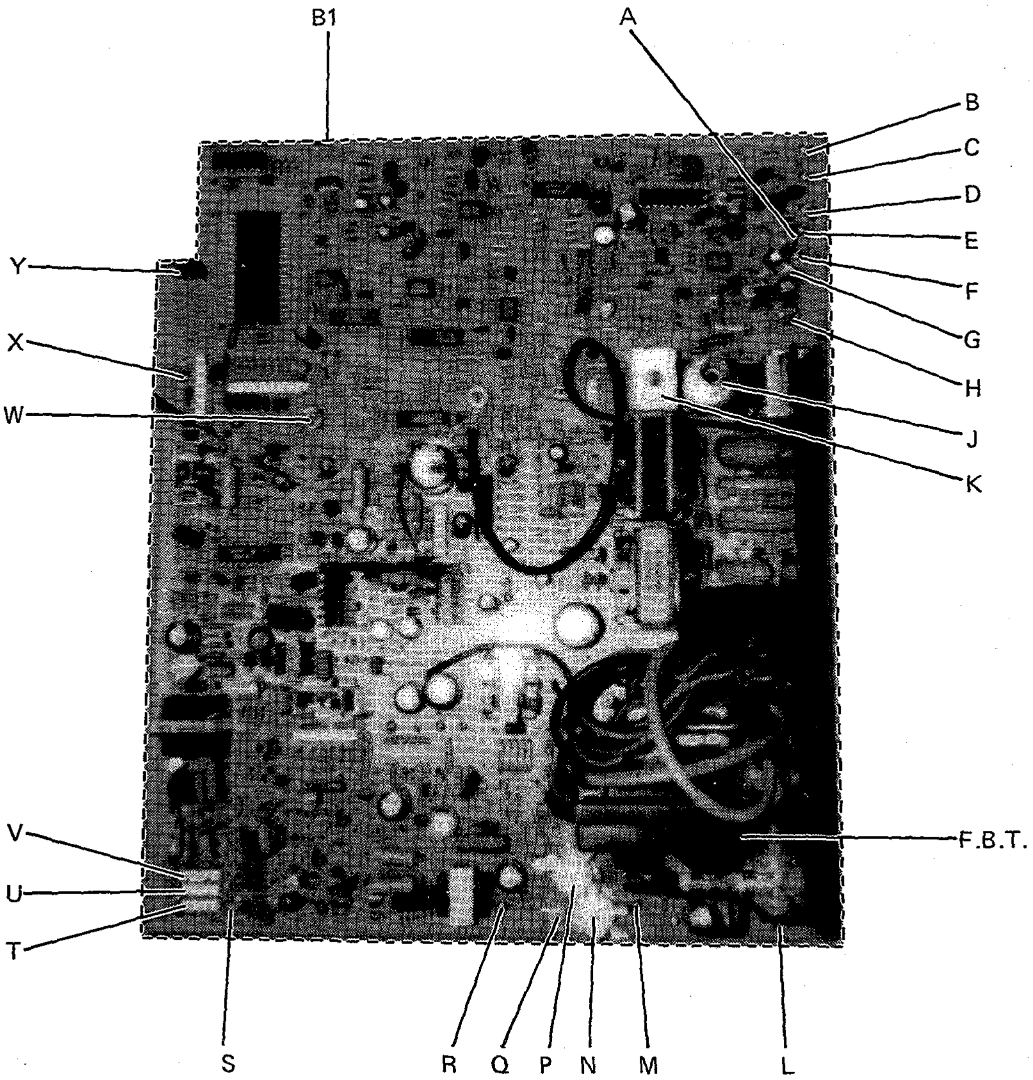
Cut the band and remove the screw "c". Remove the SW. REG. UNIT.

PARTS LOCATION DIAGRAMS



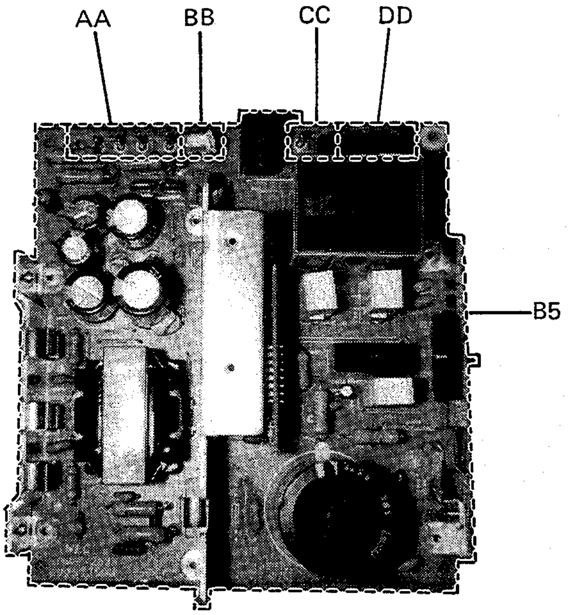
BOARDS

B1	MAIN PWB ASSY	PWE-248A	
B2	CONTROL PWB ASSY	PWE-248B	
B3	VIDEO/CRT PWB ASSY	PWE-249	
B4	SUB PWB UNIT	PWE-250	
B5	SW. REG. PWB ASSY	PWE-253	JC-1404HME/EE/R
B6	SW. REG. PWB ASSY	PWE-270	JC-1404HMED

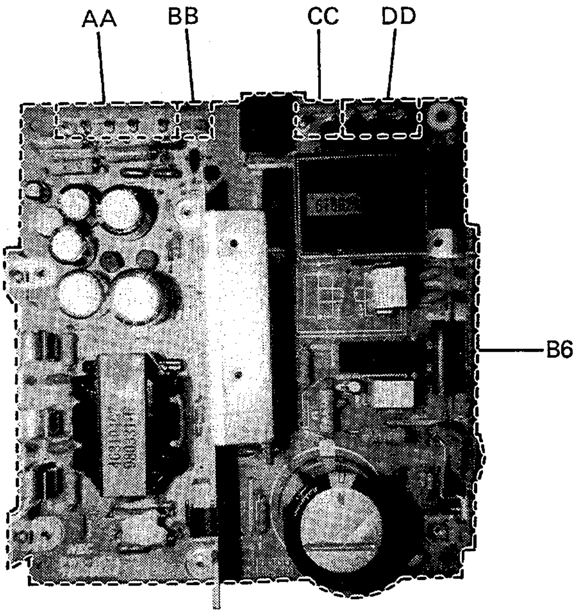

B1
A
B
C
D
E
F
G
H
J
K
Y
X
W
V
U
T
F.B.T.
S
R
Q
P
N
M
L

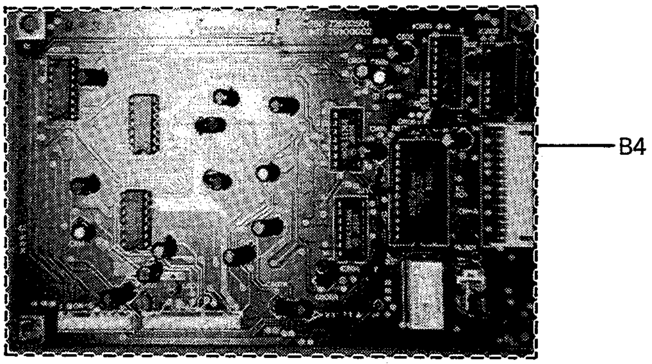
A	VR501 H. HOLD (1)	Q	VR504 H. V. ADJ
B	TP501	R	TP551
C	TP401	S	VR503
D	TP2005	T	RH3
E	TP2006	U	RH2
F	TP502	V	RH1
G	VR502 H. HOLD (2)	W	VR402 SIDE PIN ADJ
H	VR505	X	TP151
J	L503 H. WIDTH COIL	Y	TP152
K	L504 H. LIN COIL		
L	TP2001		
M	TP2003		
N	VR2002		
P	VR2001	B1	**MAIN PWB ASSY (PWE-248A)**

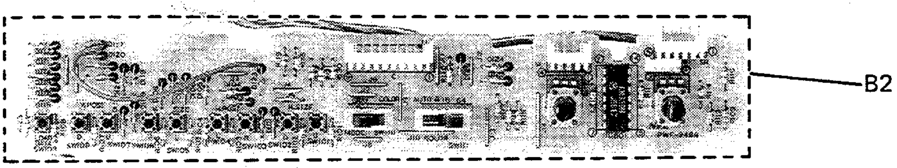
model JC-1404HME/EE/R


AA
BB
CC
DD
B5

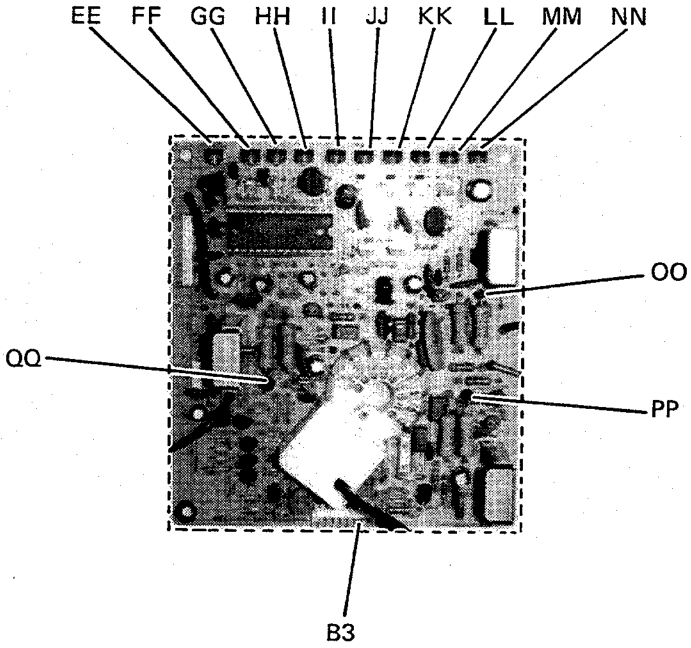
model JC-1404HMED


AA
BB
CC
DD
B6





AA	CONNECTOR K	B2	CONTROL PWB ASSY (PWE-248B)
BB	VR651	B4	SUB PWB UNIT (PWE-250)
CC	CONNECTOR Z	B5	SW. REG. PWB ASSY (PWE-253)
DD	CONNECTOR SW	B6	**SW. REG. PWB ASSY (PWE-270)**


EE
FF
GG
HH
II
JJ
KK
LL
MM
NN
OO
QQ
PP
B3

EE	VR904 SUB CONT
FF	VR903 GAIN-B
GG	VR902 GAIN-G
HH	VR901 GAIN-R
II	VR910 BIAS-B
JJ	VR909 BIAS-G
KK	VR908 BIAS-R
LL	VR907 SUB BRIGHT-B
MM	VR906 SUB BRIGHT-G
NN	VR905 SUB BRIGHT-R
OO	TP901
PP	TP902
QQ	TP903
B3	VIDEO CRT PWB ASSY (PWE-249)

ADJUSTMENT PROCEDURE

Standard Adjustment Conditions

1) Power source voltage: AC220V, 240V 50 Hz/60 Hz
2) Aging: Adjust after leaving power on for a minimum twenty minutes.
3) Signals:

Video : Analog 0.7Vp-p 75Ω terminal positive polarity
Analog sync. on green
Video : 0.7Vp-p
Synchronizing . 0.3Vp-p
Synchronizing : TTL level Negative polarity/positive polarity
Separate/composite
Deflection frequency : H. 15kHz~38kHz
V. 50Hz~90Hz

1. SW. REG. UNIT

+85V LINE
Adjust VR651 to be 85V DC

2. Pre-adjustment of DEF PWB

Apply 23.5V DC between K3 and K4 (GND).

1) +18V adjustment
Adjust VR505 for 18V±0.05V DC between TP502 and the ground.
2) +12V adjustment
Apply a resistance load of 15Ω7W between X4 and X8 (GND).
Adjust VR503 for 12±0.05V DC between TP550 and the ground.
3) High voltage protector setting (For JC-1404HME/EE/R)
High voltage protector 1
With 25.8±0.1V DC applied between TP2001 and the ground, adjust VR2001 for 0.3±0.05V DC between TP2005 and the ground.
High voltage protector 2
With 24.5±0.1V DC applied between TP2003 and the ground, adjust VR2002 for 0.3±0.05V DC between TP2006 and the ground.
Due to DHHS, after adjusting VR2001 and VR2002, seal with an adhesive (TSE-385RTV) and cap (74004891).

3)' High voltage protector setting (For JC-1404HMED)
High voltage protector 1
With 25.6±0.1V DC applied between TP2001 and the ground, adjust VR2001 for 0.3±0.05V DC between TP2005 and the ground.
High voltage protector 2
With 26.1±0.1V DC applied between TP2003 and the ground, adjust VR2002 for 0.3±0.05V DC between TP2006 and the ground.
Due to DHHS, after adjusting VR2001 and VR2002, seal with an adhesive (TSE-385RTV) and cap (74004891).

3. Main Adjustment

Set the external VRs and switches as follows unless otherwise specified.
Front controls (as seen from front)

VR101 BRIGHTNESS : At point where back raster disappears.
VR102 CONTRAST : Max. (fully clockwise)
SW110 MODE SWITCH : Off (right side)
SW111 COLOR SWITCH : Auto (left end)

3-1) DEF PWB Adjustment

A) Analog Adjustment

(1) Horizontal Hold

a) Short TP501 and the ground.

b) Receive signal 1 (15kHz) and adjust horizontal hold (1) VR501
Sor that there is one screen.

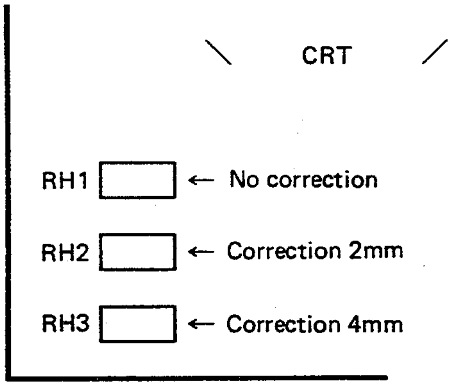
c) Receive signal 2 (38kHz) and adjust horizontal hold (2) VR501
So that there is one screen.

d) Receive the signal 1 and confirm that there is nearly one screen. If not, re-perform b) and c).

e) Remove the short between TP501 and the ground.

(2) High Voltage Adjustment
Recieve signal 8 (31.5kHz) and adjust high voltage adjustment VR504 so that the high voltage is 23.5kV with the CRT anode current cut off.
Due to DHHS, after adjusting, seal with an adhesive (TSE-385RTV) or cap (74004891).

(3) Horizontal Raster Centering
Receive signal 8 (31.5kHz) and check that the horizontal linearity is suitable. If it is extremely bad, adjust to a suitable point with L504 (H. LIN. COIL).
Turn the brightness control fully clockwise so that back raster appears, then reinsert connector RH so that the back raster is in the center of the CRT screen.



For horizontal correction, set with the direction of the connector.

(4) Side Pin Cushion
Receive signal 8 (31.5kHz) and adjust VR403 for the optimum side pin cushion distortion.
Adjust so that pin distortion is zero (straight) at one side or both sides.

(5) Horizontal Linearity
Receive Signal 5 (22.0kHz) and adjust L504 for the optimum horizontal linearity.
(Reference: Optimum is that the magnet is turned about 45° clockwise or counterclockwise.)

(6) Horizontal Width

a) Short TP151 and TP152.

b) Receive signal 8 (31.5kHz) and adjust width coil L503 for a horizontal screen size of 240±2mm.

NOTE: Do not touch the Horizontal Size Control Switch of the front panel until Horizontal Width Coil Adjustment is finished. Because the microcomputer's output voltage for the Horizontal width adjustment will change once the test pins have been shorted.
Adjust after that video area is nearly center of the raster with Horizontal Position Switch and Vertical amplitude is less than over scan (about 18mm) with Vertical Size Switch.
If Horizontal Size Control Switch is pushed by mistake, turn off the power switch and re-adjust.

B) Digital Memory Adjustment
Confirm that the adjustments as shown below are finished before performing this adjustment.

1. High Voltage Adjustment
2. Width Coil Adjustment
3. Horizontal Raster Centering Adjustment

4. Horizontal Hold Adjustment
5. Horizontal Linearity Adjustment
6. Side Pin Adjustment

This adjustment is user control to adjust with the signal 3~12.
This condition is memorized and the signal pattern is reversed cross hatch.

(1) Setting
BRIGHT VR : Max
CONTRAST VR : Min

(2) Procedure of adjustment
1 Short TP151 and TP152.

2 Receive Signal 3 (CGA).
3 Adjust so that the screen is in the center of the back raster with User Control Horizontal Position Switch.
4 Adjust so that the horizontal screen size is 240mm±2mm with User Control Horizontal Size Switch.
5 Adjust so that vertical position of the screen is in the center of CRT with User Control Vertical Position Switch.
6 Adjust so that the vertical screen size is 180mm±2mm with User Control Vertical Size Switch.
7 Push the Memory Recall Switch. (over 5 sec.)

8 Receive Signal 4 (MDA).
9 Turn on the Mode Switch.
10 Perform the shown above 3~7.

11 Turn off the Mode Switch.
12 Receive Signal 5 (EGA).
13 Perform the shown above 3~7.

14 In the same way, perform the shown above 3~7 with signal 6~12.
However, adjust so that the horizontal screen size is 250mm±2mm and the vertical screen size is 187mm±2mm with signal 10 (8514A).

15 Remove the test pin short after confirm that the adjustments with signal 3~12 are finished.
16 Confirm by watching that the screen size position is correct on the all mode.
If not, re-adjust on the mode only and re-confirm on the all mode.

3-2) VIDEO CRT PWB (Adjustment of Video Amplitude and White Balance)

NOTE: Check that the video signals are as shown below before performing the main adjustment. In particular, for LVG-1603, the video signal output level varies according to the signal pattern, so check the level with the signal to be adjusted.

Video : Analog 0.7Vp-p
Synchronizing : H.V Separate TTL level

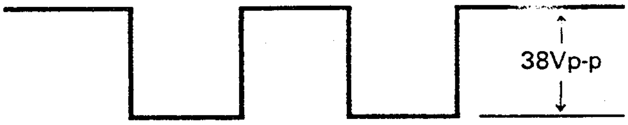
(1) Initial Setting of Adjustment VRs

VR901~903	GAIN VR	: Fully counterclockwise (MIN)
VR904	SUB CONT. VR	: Fully clockwise (MAX)
VR906, 908, 910	BIAS VR	: Fully clockwise (cathode voltage rising
VR905, 907, 909	SUB BRIGHT VR	: Mechanical Center
SCREEN VR		: Fully counterclockwise (MIN)

(2) Video Contrast Adjustment (Window pattern)
a) GAIN VR adjustment
1 Receive the window pattern (the video area of 1/3~1/2H x 1/2V in which there is no ABL even with contrast at maximum is preferable) (Signal 12)

2 Contrast control : Fully clockwise
Brightness control : Fully counterclockwise

3 Adjust VR901, VR902 and VR903 so that the output voltage is 38Vp-p.
After Adjusting, check the Vp-p again and readjust if they do not confirm to the settings.



b) SUB CONT. VR adjustment

1 Contrast control : Fully counterclockwise
Brightness control : Fully counterclockwise

2 Adjust VR904 so that TP902 (GREEN OUT) output is 10Vp-p.
After adjusting, check that TP901 (RED OUT) and TP903 (BLUE OUT) outputs are 10Vp-p ±0.5Vp-p.
If not, fine-adjust VR904 so that the R, G and B outputs are within the range of 10Vp-p ±0.5Vp-p.

(3) Cut-off Adjustment (All Black Signal)
Contrast control : Fully counterclockwise
Brightness control : Fully counterclockwise

a) 1 Short TP551 and the ground. (chassis)
2 Short TP401 and the ground. (chassis)
3 As the screen VR is turned gradually clockwise, a single color will appear as a horizontal line. This color is the reference color for the cut-off adjustment.

b) Turn the bias VRs for the other color than the reference color until bright as the reference color.

c) 1 Remove the short between TP401 and the ground. (chassis)
Otherwise, replace VR401 original position (voltage of pin 4 IC501 is 6V±0.1V).
2 Remove the short between TP551 and the ground. (chassis)

NOTE: Perform the cut-off adjustment in as dark a place as possible to make the white tracking which follows better.

(4) SUB BRIGHT VR Adjustment

a) Receive signal 8 (All black signal).
Contrast control : Fully counterclockwise
Brightness control : Fully clockwise, so that there is only back raster on the screen.

b) Turn SUB BRIGHT VR for the other color than the reference color of (3) Cut-off Adjustment and adjust so that back raster become to be white.

(5) Fine Adjustment of White Balance
Color temperature: Center X = 0.310
Y = 0.325
The color should be white with a slightly blue tinge.

a) Receive signal 8 (VGA 400 lines) H. gray scale (16 gradations).

b) Contrast control : Fully counterclockwise
Brightness control : Fully clockwise
Check that the white balance is proper for all gradations.
If not, fine adjust to make it white with SUB BRIGHT VR for the other color than the reference color.

c) Contrast control : Fully clockwise
Brightness control : At a point where no back raster appears
Check that the white balance is proper for all gradations.
If not, fine adjust to make it white with GAIN VR for the other color than the reference color.

(6) Focus Adjustment

a) Receive signal 12 (all white "%" or 4-dots missing signal)
   Contrast control : Fully clockwise
   Brightness control : At a point where no back raster appears

b) Turn the focus control and adjust for the optimum focus.

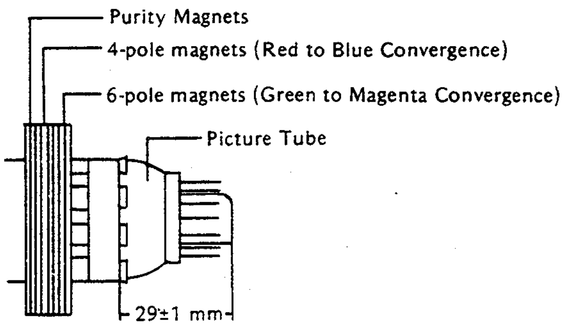
(7) Purity Adjustment

a) Be sure that the display is not being exposed to any external magnetic fields.

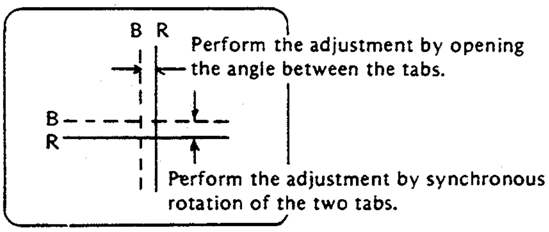
b) Ensure that the spacing between the Purity, Convergence Magnet, (PCM), assembly and the CRT stem is 29mm ±1mm. (See below diagram)

c) Produce a complete, red pattern on the display. Adjust the Purity magnet rings on the PCM assembly to obtain a complete field of the color red. This is done by moving the two tabs in such a angle between the two tabs, which should be approximately 180°.

d) Check the complete blue and complete green patterns to observe their respective color purity. Make minor adjustment if needed.


Purity Magnets
4-pole magnets (Red to Blue Convergence)
6-pole magnets (Green to Magenta Convergence)
Picture Tube
29±1 mm

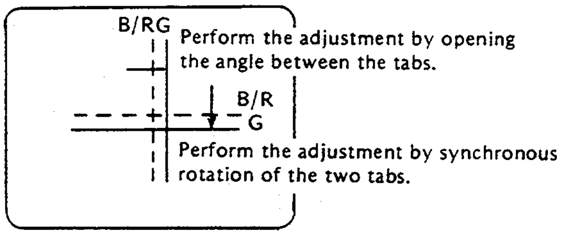
Purity, Convergence Magnet Assembly (PCM)



Perform the adjustment by opening the angle between the tabs.

Perform the adjustment by synchronous rotation of the two tabs.

Red to Blue Convergence
(Magenta)



Perform the adjustment by opening the angle between the tabs.

Perform the adjustment by synchronous rotation of the two tabs.

Green to Magenta Convergence
(White)

(8) Convergence Adjustment

a) Produce a magenta crosshatch on the display.

b) Adjust the focus for the best overall focus on the display.
   Also adjust the brightness to the desired condition.

c) Vertical red and blue lines are converged by varying the angle between the two tabs of the 4-pole magnets on the PCM assembly. (See above diagrams)

d) Horizontal red and blue lines are converged by varying the two tabs together, keeping the angle between them constant.

e) Produce a white crosshatch pattern on the display.

f) Vertical green and magenta lines are converged by varying the angle between the two tabs of the 6-pole magnets.

g) Horizontal green and magenta lines are converged by varying the two tabs together, keeping the angle between them constant.

TIMING OF REFERENCE SIGNALS

SIGNALS FOR USING LVG-1603

	Abbreviation	Unit	1	2	3	4	5	6	7	8	9	10	11	12
			15kHz	38kHz	CGA	MDA	EGA	PGC	VGA 350	VGA 400	VGA 480	8514A	MAC II	800 x 600
HORIZONTAL	Total	DOT	896	1024	896	882	744	824	900	900	900	1264	864	1024
	Rate	KHz	15.0000	38.0000	15.8500	18.4300	22.0000	30.4800	31.4700	31.4700	31.4700	35.5200	35.0000	35.1600
	Dots/Character	DOT	8	8	8	9	8	8	9	9	9	8	8	8
	Characters	CHR	80	100	80	80	80	80	80	80	80	128	80	100
	Drive Delay	DOT	736	824	736	729	640	640	738	738	738	1032	656	824
	Drive Width	DOT	56	72	56	135	80	48	108	108	108	176	64	72
VERTICAL	Total	RASTER	250	626	260	370	366	508	449	449	525	409	525	626
	Rate	Hz	60.0000	60.7000	60.9600	49.8100	60.1100	60.0000	70.0900	70.0900	59.9400	43.4800	66.6700	56.2400
	Lines/Character	RASTER	10	15	10	14	10	10	14	16	16	8	16	15
	Rows	RASTER	200	600	200	350	350	480	350	400	480	384	480	600
	Drive Delay	RASTER	228	601	225	350	351	481	387	412	490	384	483	601
	Drive Width	RASTER	2	2	3	15	13	2	2	2	2	4	3	2
Dot Rate		MHz	13.4400	38.9120	14.2016	16.2553	16.3680	25.1155	28.3230	28.3230	28.3230	44.8973	30.2400	36.0038
Scan Mode			0											
Character Font			0											
Character Code			48											
Patten Key Code			—											
Video Output			—											
Add Sync/Inverse			0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0100	0000
Dot Duty/Set			00	00	00	00	00	01	00	00	00	00	00	00
Polarity			11	11	11	10	10	11	10	01	00	11	00	11

DATA FORMAT FOR USING Quantum 801C

TIMING PARAMETERS:

Real Time Parameters

Dot Rate	MHz
Horizontal Rate	KHz
Vertical Rate	Hz

Non-Real Time Parameters

Horizontal	Vertical
Dots/Character	Lines/Character
Total	Total
Characters	Rows
Drive Delay	Drive Delay
Drive Width	Drive Width
	Step Width

OPTION PARAMETERS

Signal Gating

Composit Sync.	OP 1.—0=off	1=on
Vertical Step	OP 2.—0=off	1=on
Horizontal Drive	OP 3.—0=off	1=on
Vertical Drive	OP 4.—0=off	1=on

Signal Polarity

Composite Sync.	OP 5.—0=non-inverted 1=inverted
Vertical Step	OP 6.—0=non-inverted 1=inverted
Horizontal Drive	OP 7.—0=non-inverted 1=inverted
Vertical Drive	OP 8.—0=non-inverted 1=inverted
Video	OP 13.—0=non-inverted/positive 1=inverted/positive 2=non-inverted/negative 3=inverted/negative

Interlace Mode	OP 9.—0=non-interlace 1=interlaced sync only 3=interlaced sync & video
Video Mode	OP 10.—0=monochrome 1=color
Duty Cycle	OP 11.—0=50% 1=100% (OP 12.0) 0 or 1=100% (OP 12.2)
Character Clocking Mode	OP 12.—0=single-phase 2=dual-phase
Horizontal Skew	OP 14.—skew right 0-3 dots
Vertical Skew	OP 15.—skew down 0-9 lines
Cursor	OP 16.—0=off 1=fast blink 2=slow blink 3=on continuous

SIGNALS for using QUANTUM 801C

	1	2	3	4	5	6	7	8	9	10	11	12
Real Time Parameters		*								*		*
Dot Rate (MHz)	13.440	29.184	14.202	16.255	16.368	25.116	28.324	28.324	28.324	22.449	30.246	27.003
Horizontal Rate (kHz)	15.000	38.000	15.850	18.430	22.000	30.480	31.470	31.470	31.470	35.520	35.000	35.160
Vertical Rate (Hz)	60.000	60.700	60.960	49.810	60.110	60.000	70.000	70.000	59.943	86.960	66.667	56.000
Non-Real Time Parmeters												
H: Dots/Character	8	6	8	9	8	8	9	9	9	8	8	6
Total	112	128	112	98	93	103	100	100	100	79	108	128
Characters	80	100	80	80	80	80	80	80	80	64	80	100
Drive Delay	92	103	92	81	80	80	82	82	82	64	88	103
Drive Width	7	9	7	15	10	6	12	12	12	11	8	9
V: Lines/Character	10	15	10	14	10	10	14	16	16	16	16	15
Total	250	626	326	370	366	508	449	449	525	409	525	626
Rows	20	40	20	25	35	48	25	25	30	24	48	40
Drive Delay	22	40	22	25	35	48	28	26	31	24	48	40
Drive Width	2	2	3	15	13	2	2	2	2	4	3	2
Step Width	—	—	—	—	—	—	—	—	—	—	—	—
Signal Gating												
Composite Sync	0	0	0	0	0	1	0	0	0	0	1	0
Vertical Step	0	0	0	0	0	0	0	0	0	0	0	0
Horizontal Drive	1	1	1	1	1	0	1	1	1	1	0	1
Vertical Drive	1	1	1	1	1	0	1	1	1	1	0	1
Signal Polarity												
Composite Sync	0 P					0 P					1 N	
Vertical Step	–											
Horizontal Drive	0 P	0 P	0 P	0 P	0 P	—	0 P	1 N	1 N	0 P	1 N	0 P
Vertical Drive	0 P	0 P	0 P	1 N	1 N	—	1 N	0 P	1 N	0 P	1 N	0 P
Video	0											
Interlace Mode	0											
Video Mode	1											
Duty Cycle	0											
Character Clocking Mode	0											
Horizontal Skew	—											
Vertical Skew	—											
Cursor	—											
	15kHz	38kHz	CGA	MDA	EGA	PGC	VGA 350	VGA 400	VGA 480	8514A	MacII	800 x 600

NOTE: "*" marked signals put down the dot rate. Because, the dot rate may not exceed 32.76 MHz while in the color mode (0 P 10.1) or the signal-phase character clocking mode (0 P 12.0)

TROUBLE SHOOTING

Before using this chart, please refer to the trouble shooting in the user's manual.

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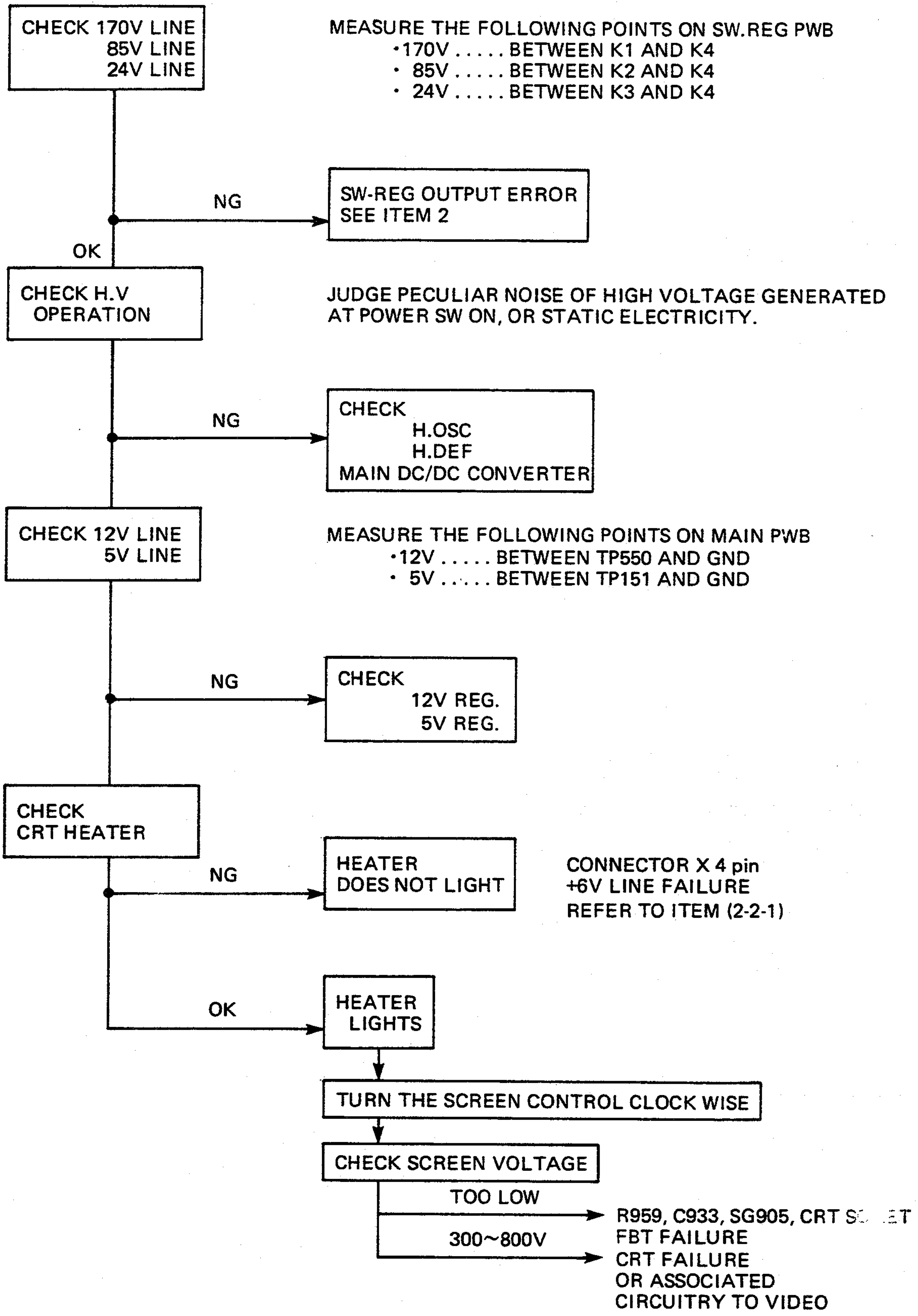
1. NO RASTER


CHECK 170V LINE
85V LINE
24V LINE
NG
SW-REG OUTPUT ERROR
SEE ITEM 2
OK
CHECK H.V
OPERATION
NG
CHECK
H.OSC
H.DEF
MAIN DC/DC CONVERTER
CHECK 12V LINE
5V LINE
NG
CHECK
12V REG.
5V REG.
CHECK
CRT HEATER
NG
HEATER
DOES NOT LIGHT
OK
HEATER
LIGHTS
TURN THE SCREEN CONTROL CLOCK WISE
CHECK SCREEN VOLTAGE
TOO LOW
300~800V

MEASURE THE FOLLOWING POINTS ON SW.REG PWB
- 170V . . . . . BETWEEN K1 AND K4
- 85V . . . . . BETWEEN K2 AND K4
- 24V . . . . . BETWEEN K3 AND K4

JUDGE PECULIAR NOISE OF HIGH VOLTAGE GENERATED AT POWER SW ON, OR STATIC ELECTRICITY.

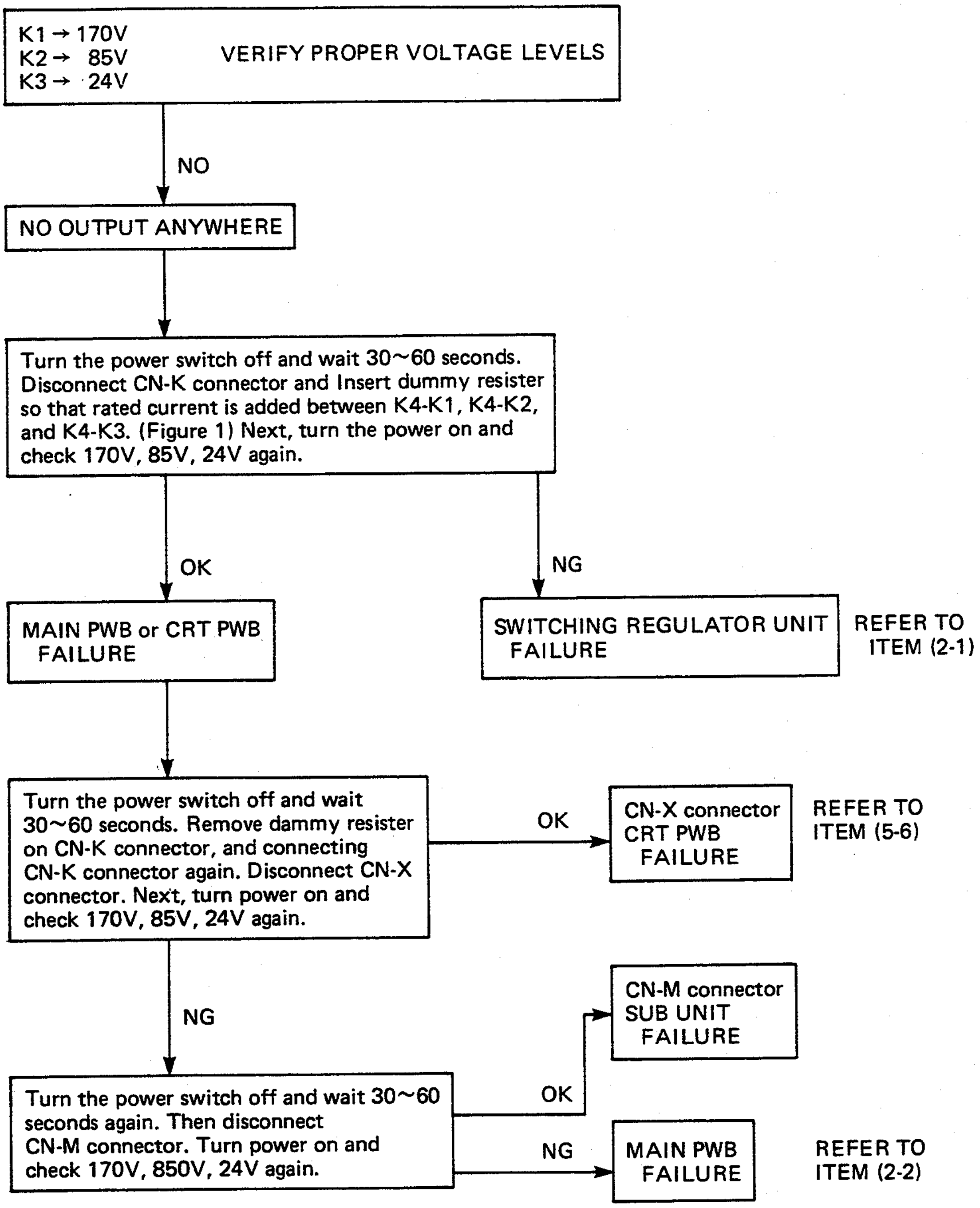
MEASURE THE FOLLOWING POINTS ON MAIN PWB
- 12V . . . . . BETWEEN TP550 AND GND
- 5V . . . . . BETWEEN TP151 AND GND

CONNECTOR X 4 pin
+6V LINE FAILURE
REFER TO ITEM (2-2-1)

R959, C933, SG905, CRT SOCKET
FBT FAILURE

CRT FAILURE
OR ASSOCIATED
CIRCUITRY TO VIDEO

2. SWITCHING REGULATOR UNIT OUTPUT ERROR


K1 → 170V
K2 → 85V
K3 → 24V
NO
OK
NG
OK
NG
OK
NG
REFER TO ITEM (2-1)
REFER TO ITEM (5-6)
REFER TO ITEM (2-2)

VERIFY PROPER VOLTAGE LEVELS

NO OUTPUT ANYWHERE

Turn the power switch off and wait 30~60 seconds. Disconnect CN-K connector and Insert dummy resister so that rated current is added between K4-K1, K4-K2, and K4-K3. (Figure 1) Next, turn the power on and check 170V, 85V, 24V again.

MAIN PWB or CRT PWB FAILURE

SWITCHING REGULATOR UNIT FAILURE

Turn the power switch off and wait 30~60 seconds. Remove dammy resister on CN-K connector, and connecting CN-K connector again. Disconnect CN-X connector. Next, turn power on and check 170V, 85V, 24V again.

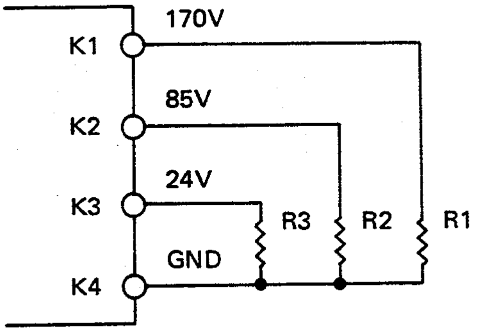
CN-X connector CRT PWB FAILURE

CN-M connector SUB UNIT FAILURE

Turn the power switch off and wait 30~60 seconds again. Then disconnect CN-M connector. Turn power on and check 170V, 850V, 24V again.

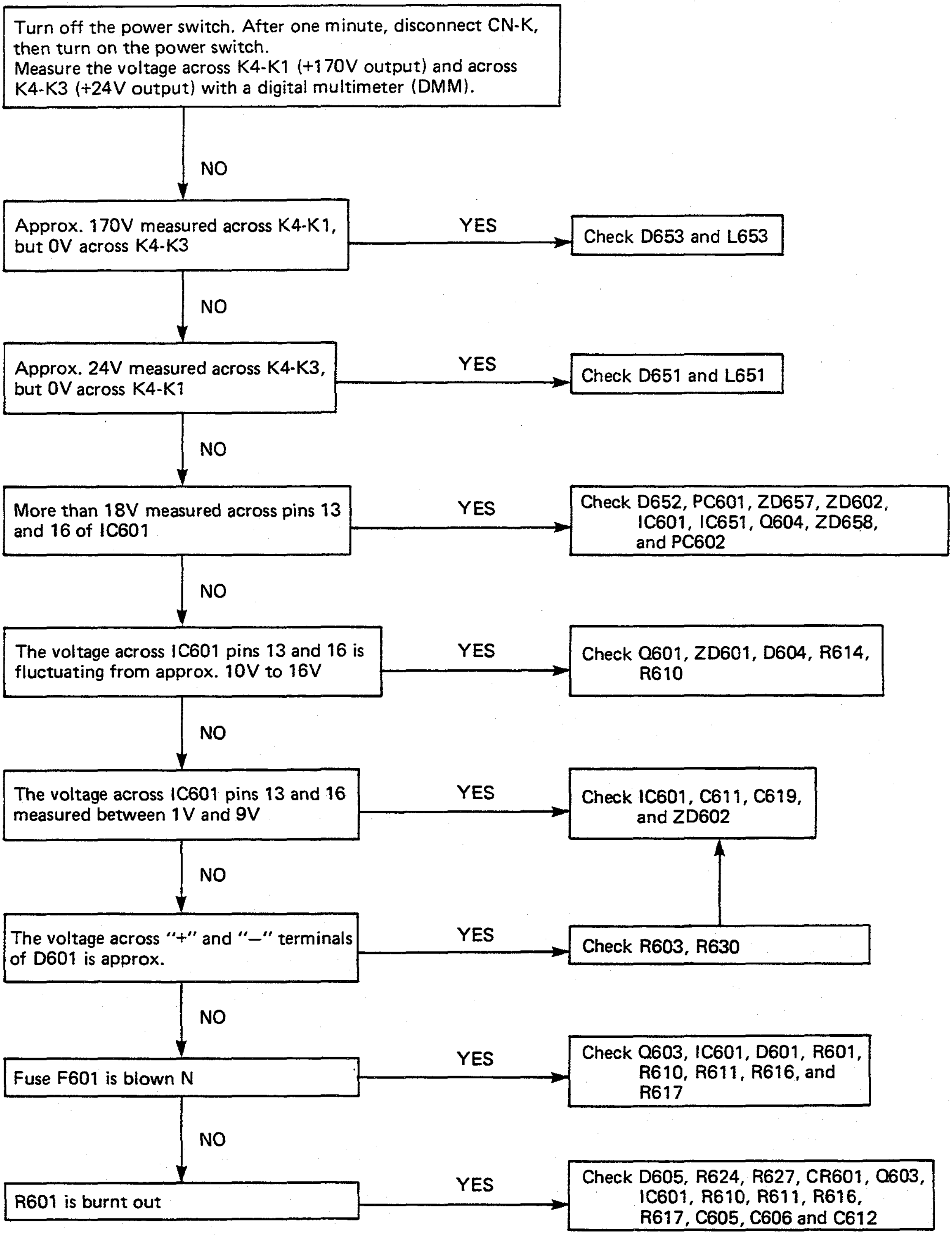
MAIN PWB FAILURE

(Fig. 2-1-1) Rated load current at K1, K2, K3


170V
K1
85V
K2
24V
K3
GND
K4
R3
R2
R1

170V	65~290mA (2.6kΩ~586.2Ω)
85V	35~230mA (2.4kΩ~369.5Ω)
24V	0.5~1.0A (48~24Ω)

(2-1) THE SWITCHING REGULATOR UNIT FAILURE

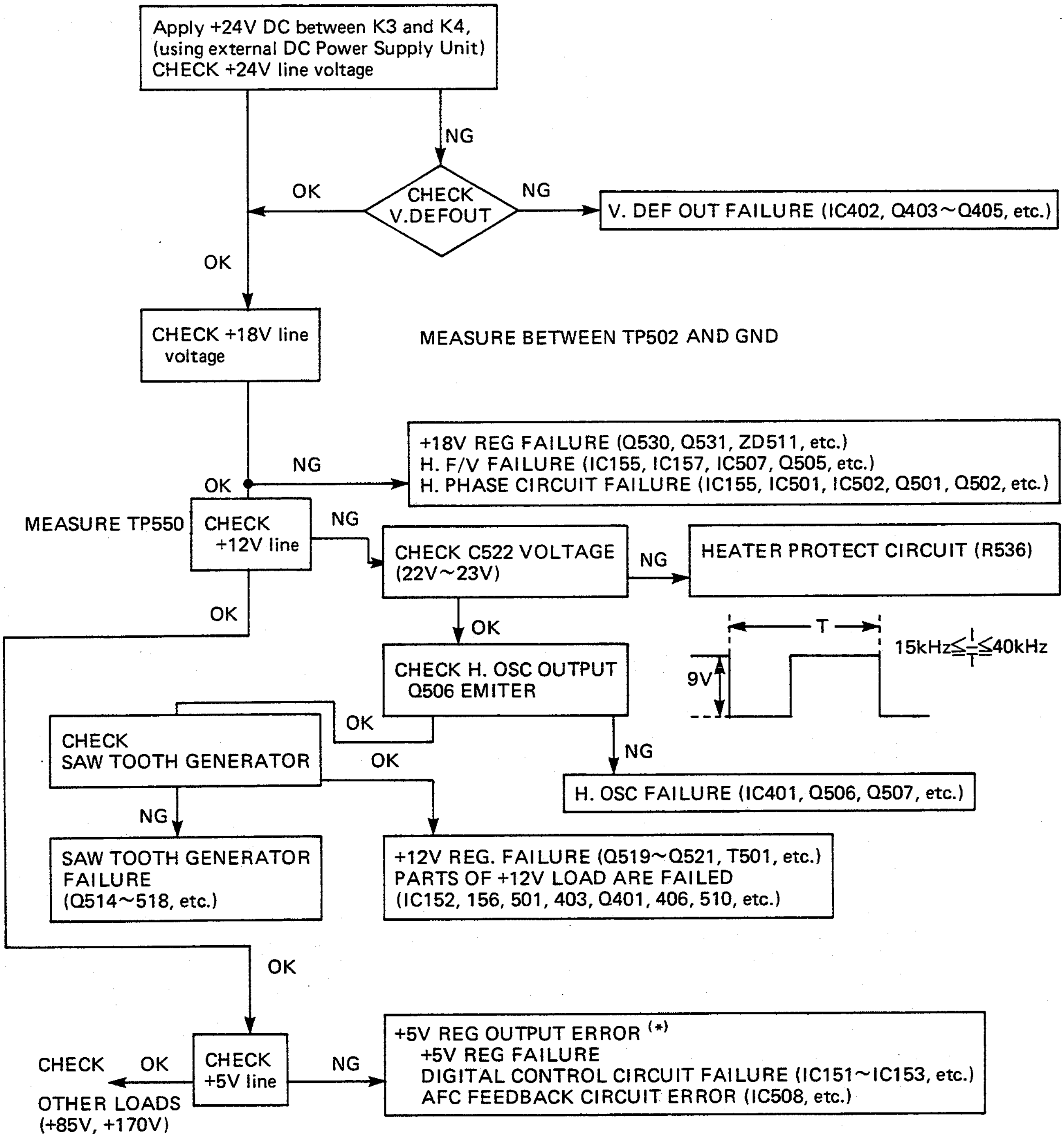

Turn off the power switch. After one minute, disconnect CN-K, then turn on the power switch.
Measure the voltage across K4-K1 (+170V output) and across K4-K3 (+24V output) with a digital multimeter (DMM).
NO
Approx. 170V measured across K4-K1, but 0V across K4-K3
YES
Check D653 and L653
NO
Approx. 24V measured across K4-K3, but 0V across K4-K1
YES
Check D651 and L651
NO
More than 18V measured across pins 13 and 16 of IC601
YES
Check D652, PC601, ZD657, ZD602, IC601, IC651, Q604, ZD658, and PC602
NO
The voltage across IC601 pins 13 and 16 is fluctuating from approx. 10V to 16V
YES
Check Q601, ZD601, D604, R614, R610
NO
The voltage across IC601 pins 13 and 16 measured between 1V and 9V
YES
Check IC601, C611, C619, and ZD602
NO
The voltage across "+" and "–" terminals of D601 is approx.
YES
Check R603, R630
NO
Fuse F601 is blown N
YES
Check Q603, IC601, D601, R601, R610, R611, R616, and R617
NO
R601 is burnt out
YES
Check D605, R624, R627, CR601, Q603, IC601, R610, R611, R616, R617, C605, C606 and C612

(2-2) MAIN PWB +B line FAILURE

Remove MAIN PWB from chassis-then
You should check following +B line loads.

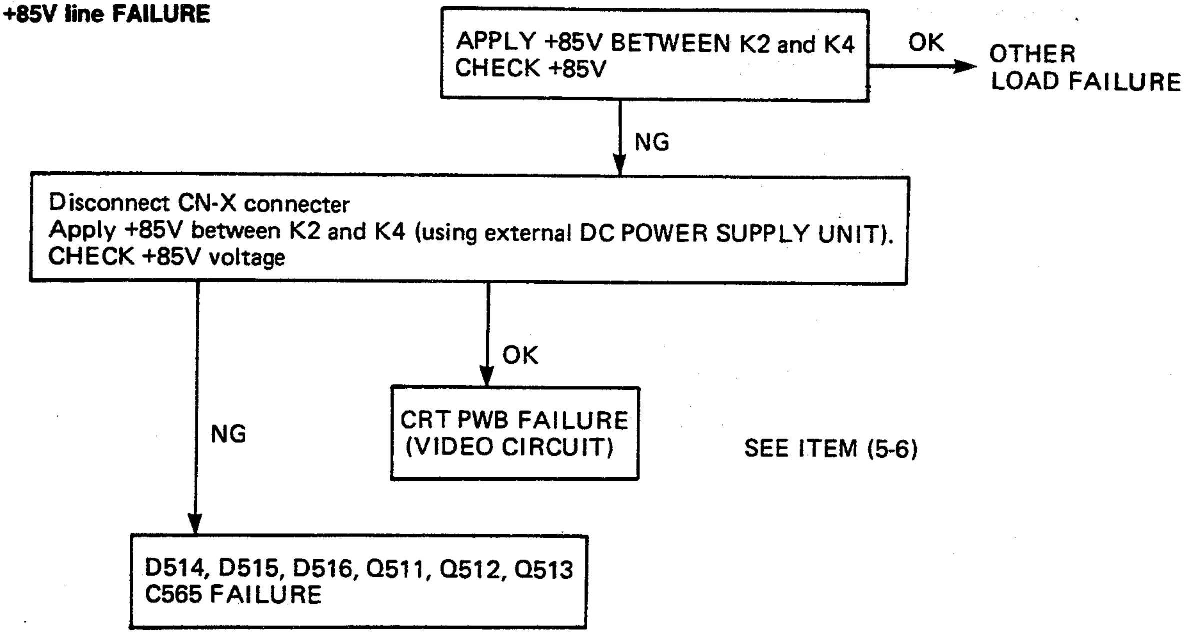
(2-2-1) +24V line load
(2-2-2) +85V line load
(2-2-3) +170V line load

(2-2-1) +24V line FAILURE

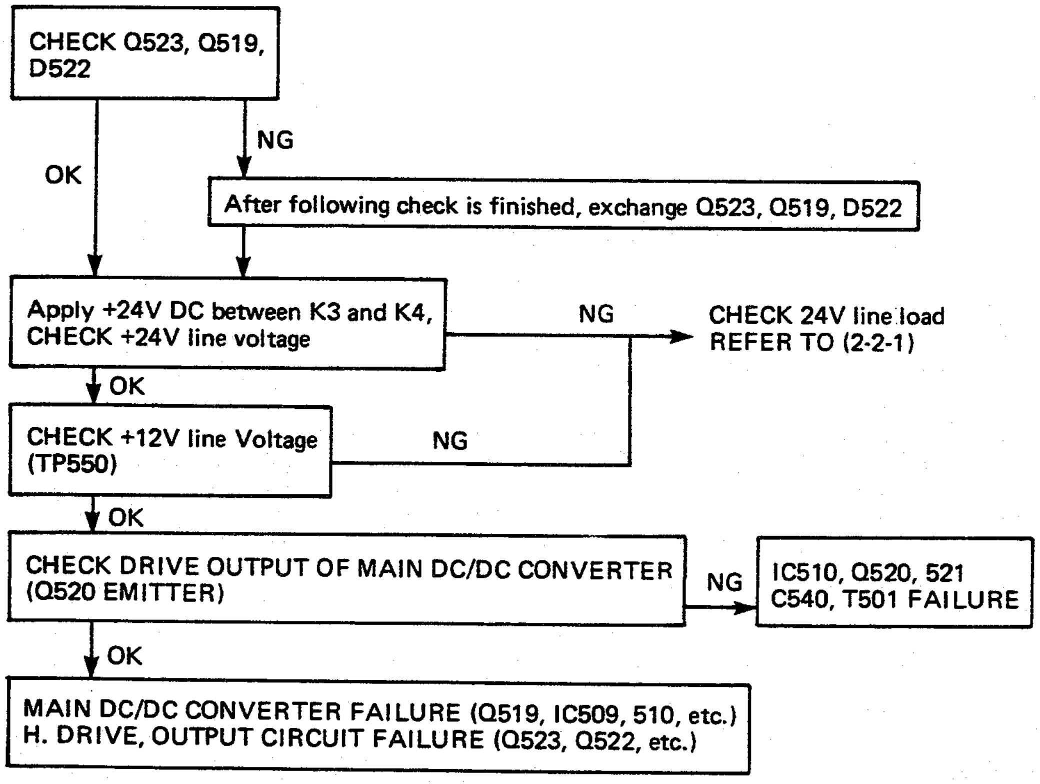

Apply +24V DC between K3 and K4,
(using external DC Power Supply Unit)
CHECK +24V line voltage
NG
OK
CHECK V.DEFOUT
NG
V. DEF OUT FAILURE (IC402, Q403~Q405, etc.)
OK
CHECK +18V line voltage
MEASURE BETWEEN TP502 AND GND
NG
+18V REG FAILURE (Q530, Q531, ZD511, etc.)
H. F/V FAILURE (IC155, IC157, IC507, Q505, etc.)
H. PHASE CIRCUIT FAILURE (IC155, IC501, IC502, Q501, Q502, etc.)
OK
MEASURE TP550
CHECK +12V line
NG
CHECK C522 VOLTAGE (22V~23V)
NG
HEATER PROTECT CIRCUIT (R536)
OK
OK
CHECK H. OSC OUTPUT Q506 EMITER
T
15kHz≦1/T≦40kHz
9V
CHECK SAW TOOTH GENERATOR
OK
OK
NG
H. OSC FAILURE (IC401, Q506, Q507, etc.)
NG
SAW TOOTH GENERATOR FAILURE (Q514~518, etc.)
+12V REG. FAILURE (Q519~Q521, T501, etc.)
PARTS OF +12V LOAD ARE FAILED
(IC152, 156, 501, 403, Q401, 406, 510, etc.)
OK
CHECK OTHER LOADS (+85V, +170V)
OK
CHECK +5V line
NG
+5V REG OUTPUT ERROR (*)
+5V REG FAILURE
DIGITAL CONTROL CIRCUIT FAILURE (IC151~IC153, etc.)
AFC FEEDBACK CIRCUIT ERROR (IC508, etc.)

(*) If short mode at +5V line has occered, you must check Impeadance of R567. (8.2Ω 3W)

(2-2-2) +85V line FAILURE

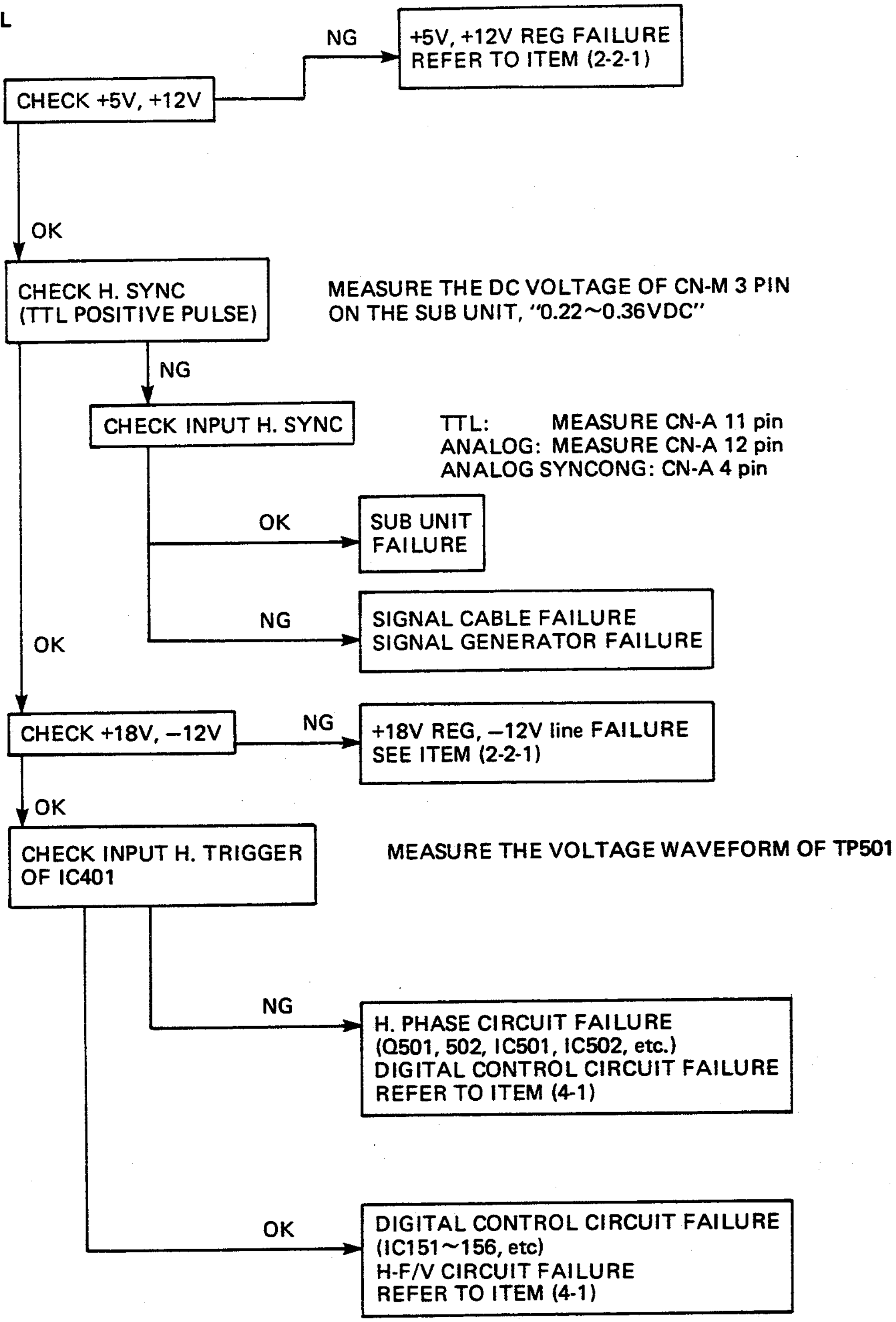

APPLY +85V BETWEEN K2 and K4
CHECK +85V
OK
OTHER
LOAD FAILURE
NG
Disconnect CN-X connecter
Apply +85V between K2 and K4 (using external DC POWER SUPPLY UNIT).
CHECK +85V voltage
OK
NG
CRT PWB FAILURE
(VIDEO CIRCUIT)
SEE ITEM (5-6)
D514, D515, D516, Q511, Q512, Q513
C565 FAILURE

(2-2-3) +170V line FAILURE


CHECK Q523, Q519,
D522
NG
OK
After following check is finished, exchange Q523, Q519, D522
Apply +24V DC between K3 and K4,
CHECK +24V line voltage
NG
CHECK 24V line load
REFER TO (2-2-1)
OK
CHECK +12V line Voltage
(TP550)
NG
OK
CHECK DRIVE OUTPUT OF MAIN DC/DC CONVERTER
(Q520 EMITTER)
NG
IC510, Q520, 521
C540, T501 FAILURE
OK
MAIN DC/DC CONVERTER FAILURE (Q519, IC509, 510, etc.)
H. DRIVE, OUTPUT CIRCUIT FAILURE (Q523, Q522, etc.)

3. LACK OF STABLE SYNCHRONIZATION

(3-1) HORIZONTAL

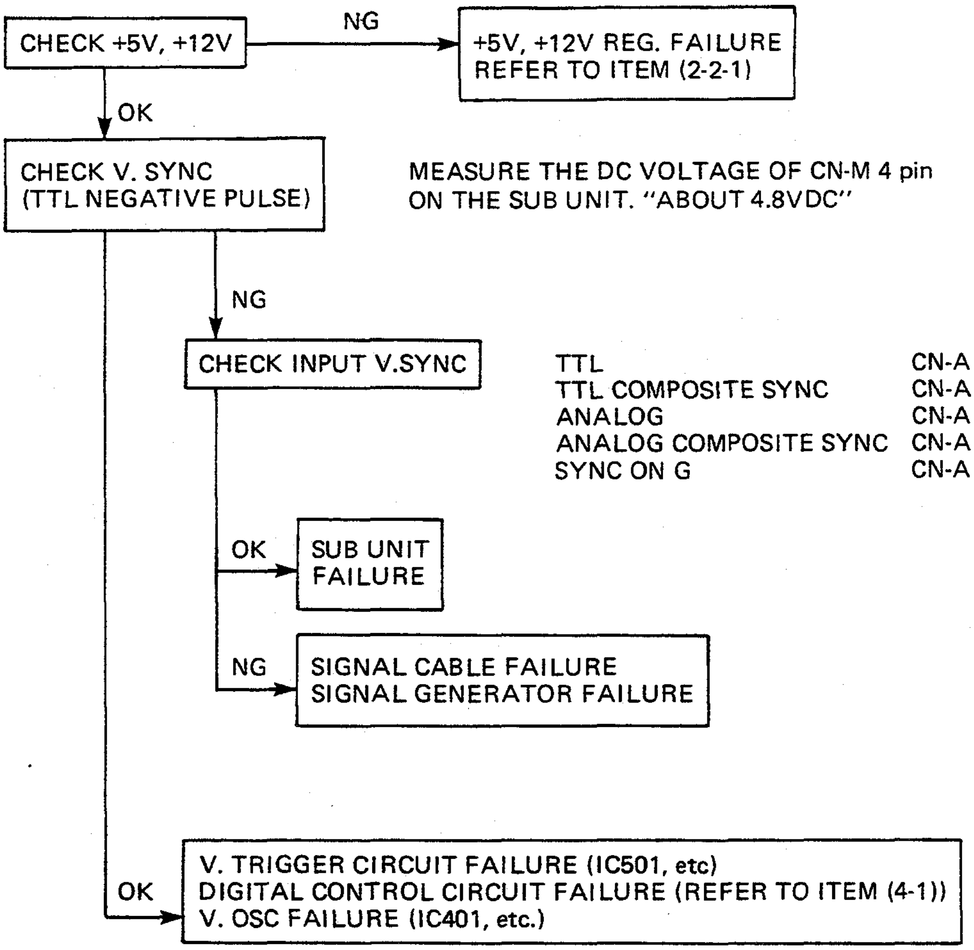

CHECK +5V, +12V
NG
+5V, +12V REG FAILURE
REFER TO ITEM (2-2-1)
OK
CHECK H. SYNC
(TTL POSITIVE PULSE)
NG
CHECK INPUT H. SYNC
OK
SUB UNIT
FAILURE
NG
SIGNAL CABLE FAILURE
SIGNAL GENERATOR FAILURE
OK
CHECK +18V, –12V
NG
+18V REG, –12V line FAILURE
SEE ITEM (2-2-1)
OK
CHECK INPUT H. TRIGGER
OF IC401
NG
H. PHASE CIRCUIT FAILURE
(Q501, 502, IC501, IC502, etc.)
DIGITAL CONTROL CIRCUIT FAILURE
REFER TO ITEM (4-1)
OK
DIGITAL CONTROL CIRCUIT FAILURE
(IC151~156, etc)
H-F/V CIRCUIT FAILURE
REFER TO ITEM (4-1)

MEASURE THE DC VOLTAGE OF CN-M 3 PIN
ON THE SUB UNIT, "0.22~0.36VDC"

TTL: MEASURE CN-A 11 pin
ANALOG: MEASURE CN-A 12 pin
ANALOG SYNCONG: CN-A 4 pin

MEASURE THE VOLTAGE WAVEFORM OF TP501

(3-2) VERTICAL

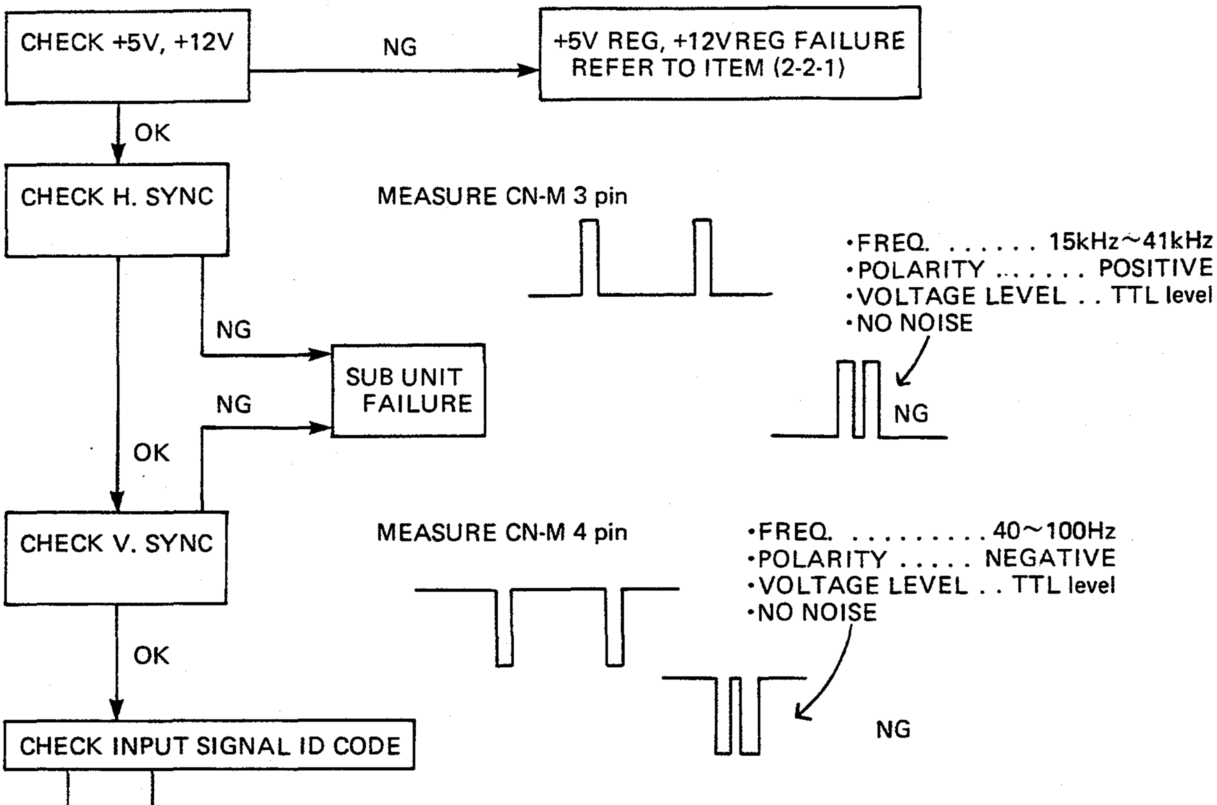

CHECK +5V, +12V
NG
+5V, +12V REG. FAILURE
REFER TO ITEM (2-2-1)
OK
CHECK V. SYNC
(TTL NEGATIVE PULSE)
NG
CHECK INPUT V.SYNC
OK
SUB UNIT FAILURE
NG
SIGNAL CABLE FAILURE
SIGNAL GENERATOR FAILURE
OK
V. TRIGGER CIRCUIT FAILURE (IC501, etc)
DIGITAL CONTROL CIRCUIT FAILURE (REFER TO ITEM (4-1))
V. OSC FAILURE (IC401, etc.)

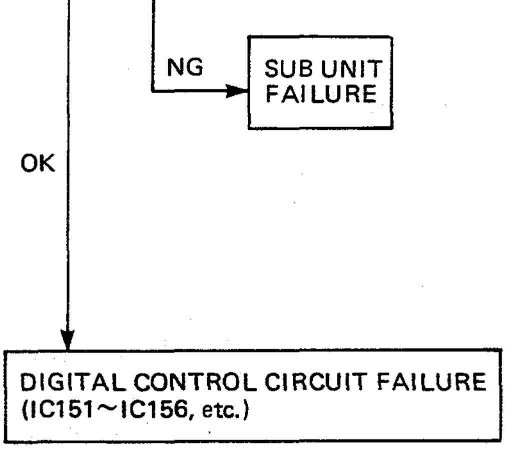
MEASURE THE DC VOLTAGE OF CN-M 4 pin
ON THE SUB UNIT. "ABOUT 4.8VDC"

TTL	CN-A	pin 9
TTL COMPOSITE SYNC	CN-A	pin 11
ANALOG	CN-A	pin 13
ANALOG COMPOSITE SYNC	CN-A	pin 12
SYNC ON G	CN-A	pin 4

4. DIGITAL CONTROL ERROR

(4-1) DIGITAL CONTROL ERROR


CHECK +5V, +12V
NG
+5V REG, +12VREG FAILURE REFER TO ITEM (2-2-1)
OK
CHECK H. SYNC
MEASURE CN-M 3 pin
•FREQ. ...... 15kHz~41kHz
•POLARITY ...... POSITIVE
•VOLTAGE LEVEL .. TTL level
•NO NOISE
NG
NG
SUB UNIT FAILURE
NG
OK
CHECK V. SYNC
MEASURE CN-M 4 pin
•FREQ. .... 40~100Hz
•POLARITY ..... NEGATIVE
•VOLTAGE LEVEL .. TTL level
•NO NOISE
NG
OK
CHECK INPUT SIGNAL ID CODE

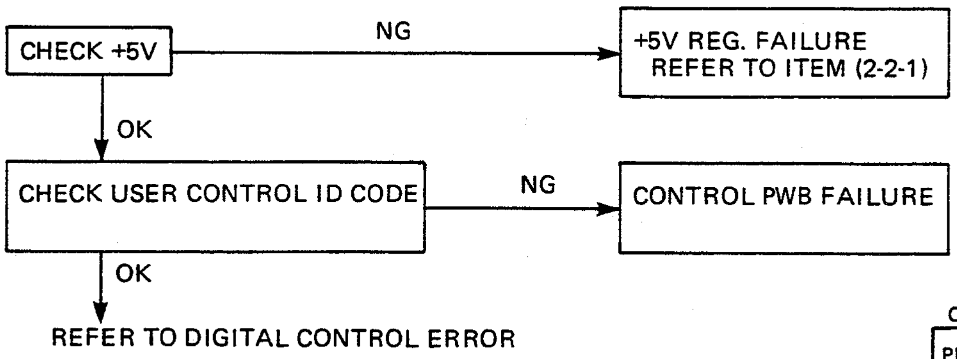

NG
SUB UNIT FAILURE
OK
DIGITAL CONTROL CIRCUIT FAILURE (IC151~IC156, etc.)

M5	M6	M7	M8	M9	M10	M3	M4	← CN CONNECTOR
PA2 TTL/ANALOG	PA3 (HP)	PA4 (VP)	PA5 (HE)	PA6 (VE)	PA7 (MODE)	F_H	F_V	
1	0	0	1	1	0	–	0	CGA
1	0	1	1	1	0	–	0	EGA
0	0	1	1	1	0	(i)	0	VGA 350
0	1	0	1	1	0	(i)	0	VGA 400
0	1	1	1	1	0	(i)	0	VGA 480
0	–	–	–	–	0	–	1	8514A
0	–	–	–	0	0	–	0	MAC II
0	0	0	1	1	0	(ii)	0	800*600(1)P.P
1	–	–	–	–	1	–	0	MDA
0	–	–	1	0	0	(i)	0	PGC
1	–	–	1	0	0	–	0	TTL C.S.
1	1	0	1	1	0	–	0	TTL N.P.
1	1	1	1	1	0	–	0	TTL N.N.
0	0	0	1	1	0	(i)	0	ANALOG(1)P.P
0	–	–	1	0	0	(ii)	0	ANALOG(2)C.S.
0	–	–	–	–	1	–	0	USER
0	0	1	1	1	0	(ii)	0	800*600(2)
0	1	0	1	1	0	(ii)	0	800*600(3)
0	1	1	1	1	0	(ii)	0	800*600(4)

F_H { (i) 15kHz~33kHz
(ii) 33kHz~40kHz

F_V { 0 40~75Hz
1 75~100Hz

(4-2) USER CONTROL ERROR

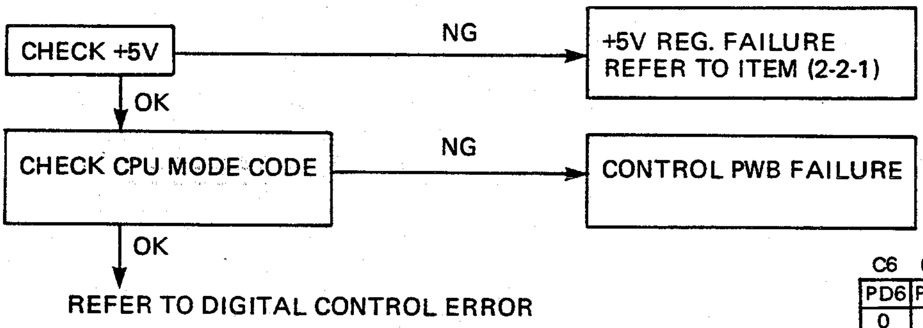

CHECK +5V
NG
+5V REG. FAILURE
REFER TO ITEM (2-2-1)
OK
CHECK USER CONTROL ID CODE
NG
CONTROL PWB FAILURE
OK
REFER TO DIGITAL CONTROL ERROR

(Cf). If two switches are pushed at the same time, the monitor will be disabled, and the user controls will not function when pressed simultaneously.

C1 PD0 (CS0)	C2 PD1 (CS1)	C3 PD2 (CS2)	
0	0	0	–
0	0	1	BRIGHT
0	1	0	CONT
0	1	1	H.POSI
1	0	0	H.SIZE
1	0	1	V.POSI
1	1	0	V.SIZE
1	1	1	DISABLE

C4 PD3	C5 PD4	
1	0	UP
0	1	DOWN
1	1	DISABLE

(4-3) MEMORY ACCESS ERROR


CHECK +5V
NG
+5V REG. FAILURE
REFER TO ITEM (2-2-1)
OK
CHECK CPU MODE CODE
NG
CONTROL PWB FAILURE
OK
REFER TO DIGITAL CONTROL ERROR

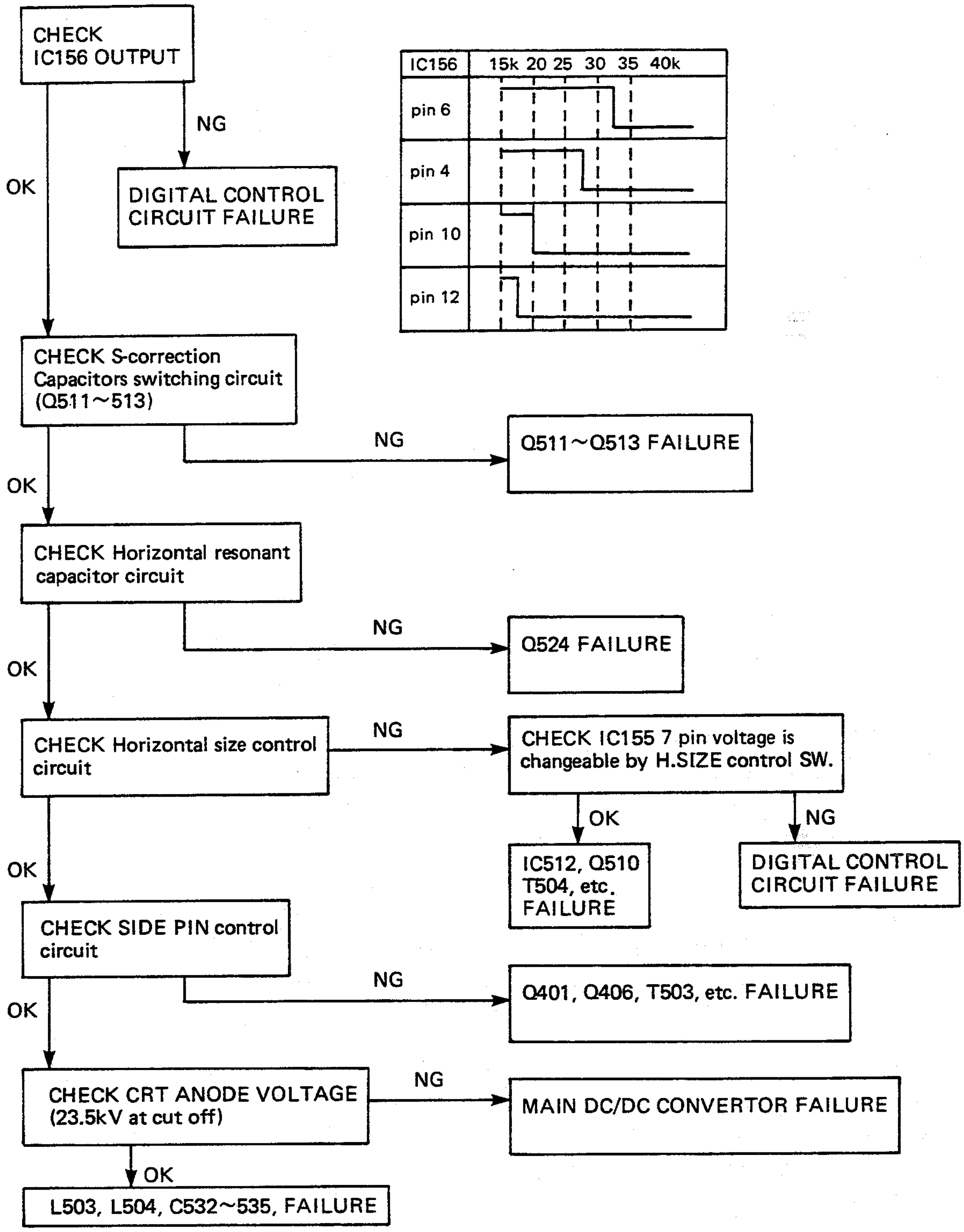
C6 PD6	C7 PD7	
0	0	USER CONTROL MODE
0	1	FACTORY ADJ. MODE
1	0	DATA LOAD
1	1	FACTORY DATA WRITING

(Cf). If two different signals are put into the same memory location, the most recent signal will be written to this memory and the previous signal erased. Therefore, an error could occur when the microprocessor will have the same ID code for two different signals.

MDA ..... TTL, MODE SW → ON
PGC ..... ANALOG, COMPOSITE SYNC, MODE SW → OFF
MACII ..... ANALOG, SYNC ON G, MODE SW → OFF

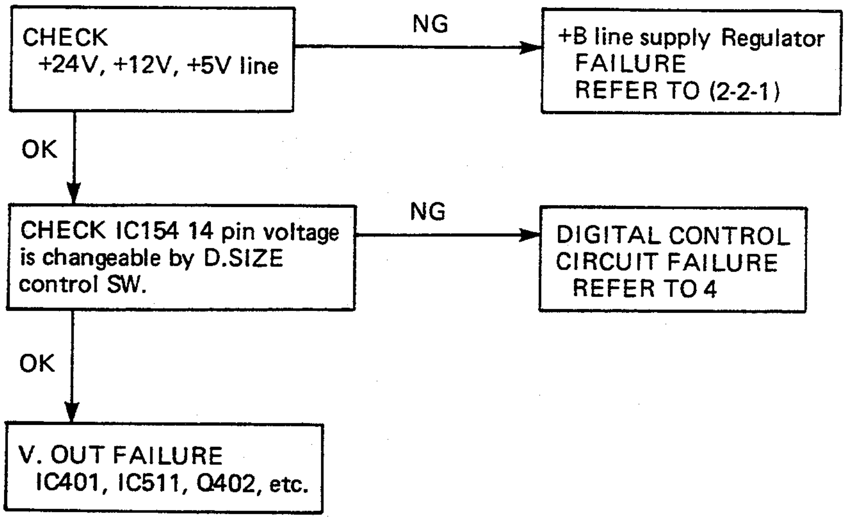
5. ABNORMAL PICTURE

(5-1) ABNORMAL HORIZONTAL WIDTH

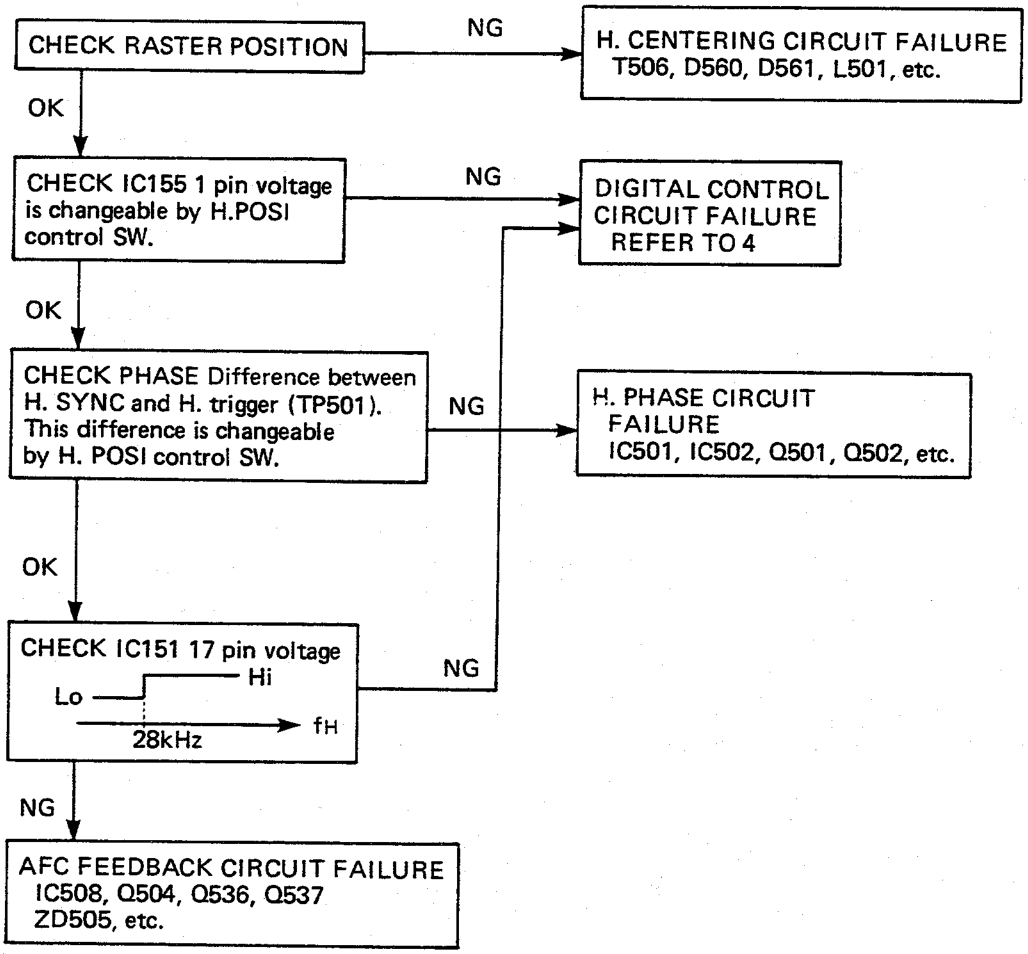

CHECK IC156 OUTPUT
NG
DIGITAL CONTROL CIRCUIT FAILURE
OK
IC156
15k 20 25 30 35 40k
pin 6
pin 4
pin 10
pin 12
CHECK S-correction Capacitors switching circuit (Q511~513)
NG
Q511~Q513 FAILURE
OK
CHECK Horizontal resonant capacitor circuit
NG
Q524 FAILURE
OK
CHECK Horizontal size control circuit
NG
CHECK IC155 7 pin voltage is changeable by H.SIZE control SW.
OK
IC512, Q510 T504, etc. FAILURE
NG
DIGITAL CONTROL CIRCUIT FAILURE
OK
CHECK SIDE PIN control circuit
NG
Q401, Q406, T503, etc. FAILURE
OK
CHECK CRT ANODE VOLTAGE (23.5kV at cut off)
NG
MAIN DC/DC CONVERTOR FAILURE
OK
L503, L504, C532~535, FAILURE

(Cf). In the case of Factory adjustment at Horizontal width.
If it occers abnormal size by using width coil, please check
Input signal conditions. It must be setted VGA mode, Analog.

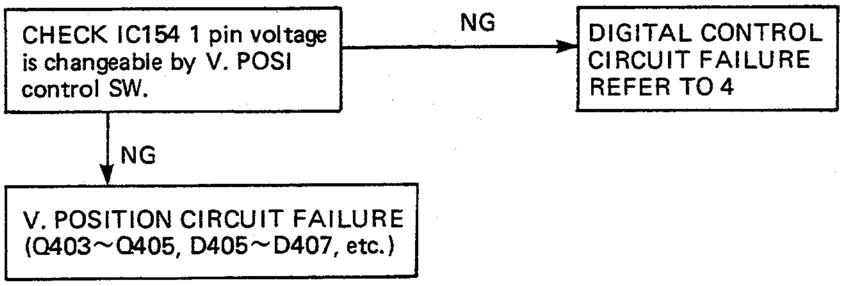
(5-2) ABNORMAL VERTICAL SIZE


CHECK +24V, +12V, +5V line
NG
+B line supply Regulator FAILURE REFER TO (2-2-1)
OK
CHECK IC154 14 pin voltage is changeable by D.SIZE control SW.
NG
DIGITAL CONTROL CIRCUIT FAILURE REFER TO 4
OK
V. OUT FAILURE IC401, IC511, Q402, etc.

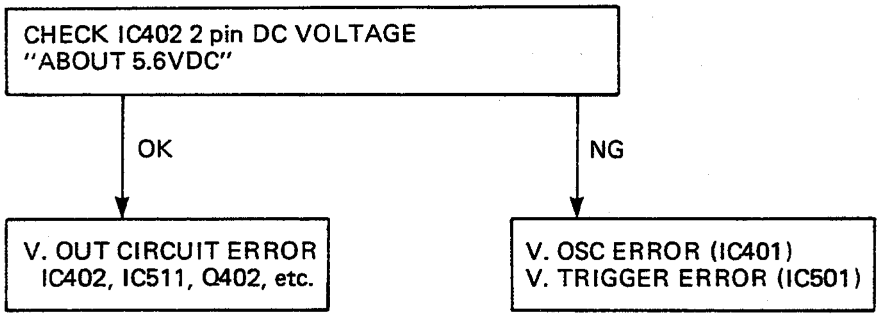
(5-3) ABNORMAL HORIZONTAL PICTURE POSITION


CHECK RASTER POSITION
NG
H. CENTERING CIRCUIT FAILURE T506, D560, D561, L501, etc.
OK
CHECK IC155 1 pin voltage is changeable by H.POSI control SW.
NG
DIGITAL CONTROL CIRCUIT FAILURE REFER TO 4
OK
CHECK PHASE Difference between H. SYNC and H. trigger (TP501). This difference is changeable by H. POSI control SW.
NG
H. PHASE CIRCUIT FAILURE IC501, IC502, Q501, Q502, etc.
OK
CHECK IC151 17 pin voltage
Hi
Lo
28kHz
fH
NG
NG
AFC FEEDBACK CIRCUIT FAILURE IC508, Q504, Q536, Q537 ZD505, etc.

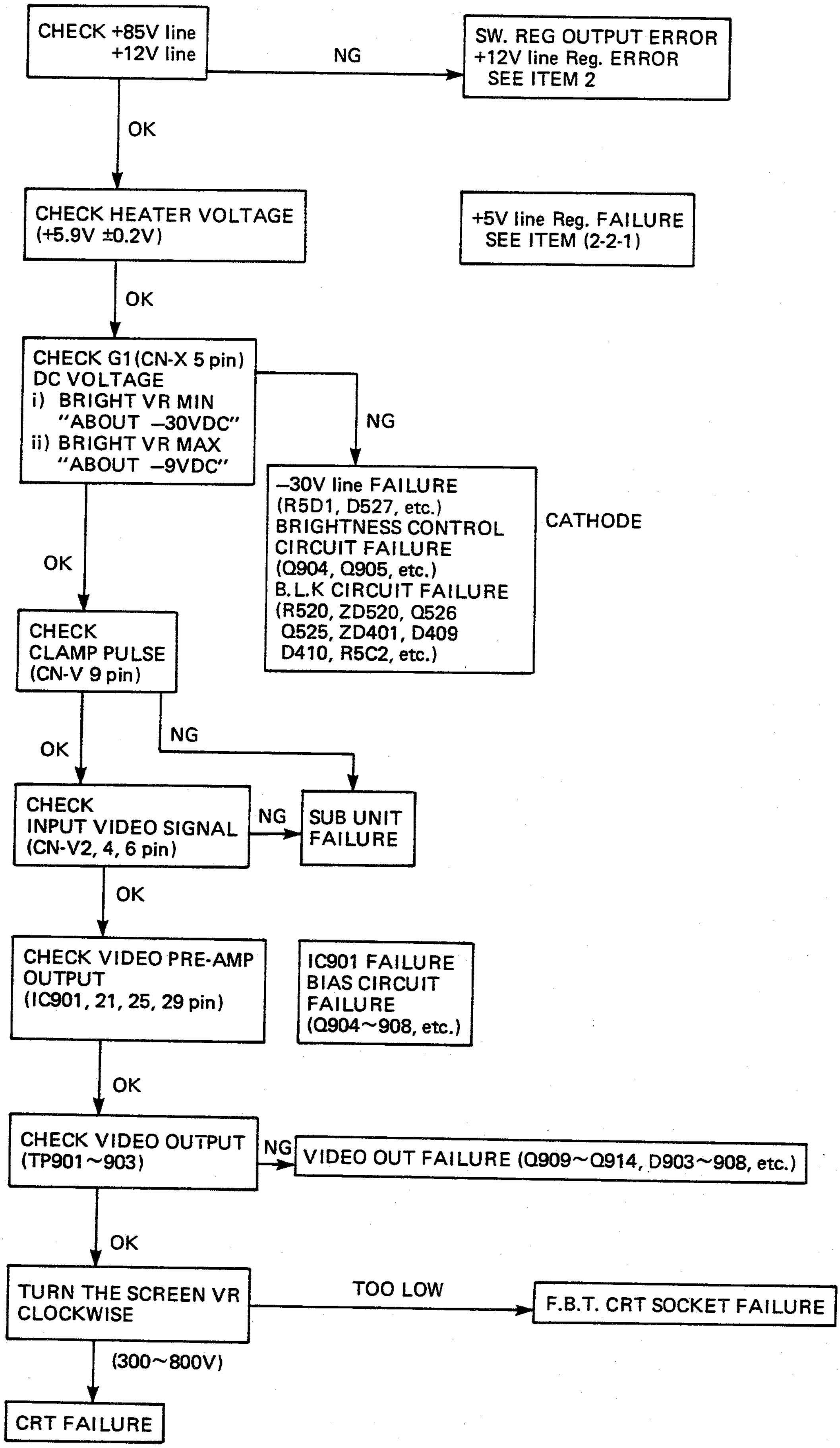
(5-4) ABNORMAL VERTICAL PICTURE POSITION


CHECK IC154 1 pin voltage is changeable by V. POSI control SW.
NG
DIGITAL CONTROL CIRCUIT FAILURE REFER TO 4
NG
V. POSITION CIRCUIT FAILURE (Q403~Q405, D405~D407, etc.)

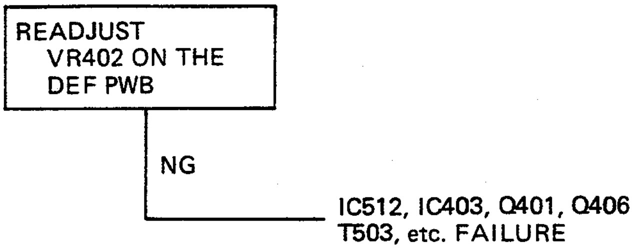
(5-5) ABNORMAL VERTICAL SCAN


CHECK IC402 2 pin DC VOLTAGE "ABOUT 5.6VDC"
OK
NG
V. OUT CIRCUIT ERROR IC402, IC511, Q402, etc.
V. OSC ERROR (IC401)
V. TRIGGER ERROR (IC501)

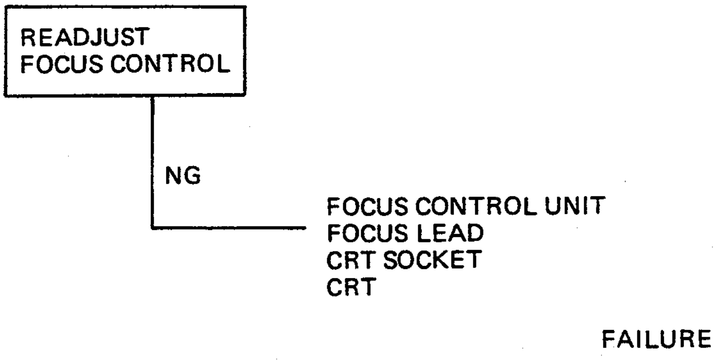
(5-6) ABNORMAL VIDEO


CHECK +85V line
+12V line
NG
SW. REG OUTPUT ERROR
+12V line Reg. ERROR
SEE ITEM 2
OK
CHECK HEATER VOLTAGE
(+5.9V ±0.2V)
+5V line Reg. FAILURE
SEE ITEM (2-2-1)
OK
CHECK G1 (CN-X 5 pin)
DC VOLTAGE
i) BRIGHT VR MIN
"ABOUT –30VDC"
ii) BRIGHT VR MAX
"ABOUT –9VDC"
NG
–30V line FAILURE
(R5D1, D527, etc.)
BRIGHTNESS CONTROL
CIRCUIT FAILURE
(Q904, Q905, etc.)
B.L.K CIRCUIT FAILURE
(R520, ZD520, Q526
Q525, ZD401, D409
D410, R5C2, etc.)
CATHODE
OK
CHECK
CLAMP PULSE
(CN-V 9 pin)
NG
OK
CHECK
INPUT VIDEO SIGNAL
(CN-V2, 4, 6 pin)
NG
SUB UNIT
FAILURE
OK
CHECK VIDEO PRE-AMP
OUTPUT
(IC901, 21, 25, 29 pin)
IC901 FAILURE
BIAS CIRCUIT
FAILURE
(Q904~908, etc.)
OK
CHECK VIDEO OUTPUT
(TP901~903)
NG
VIDEO OUT FAILURE (Q909~Q914, D903~908, etc.)
OK
TURN THE SCREEN VR
CLOCKWISE
TOO LOW
F.B.T. CRT SOCKET FAILURE
(300~800V)
CRT FAILURE

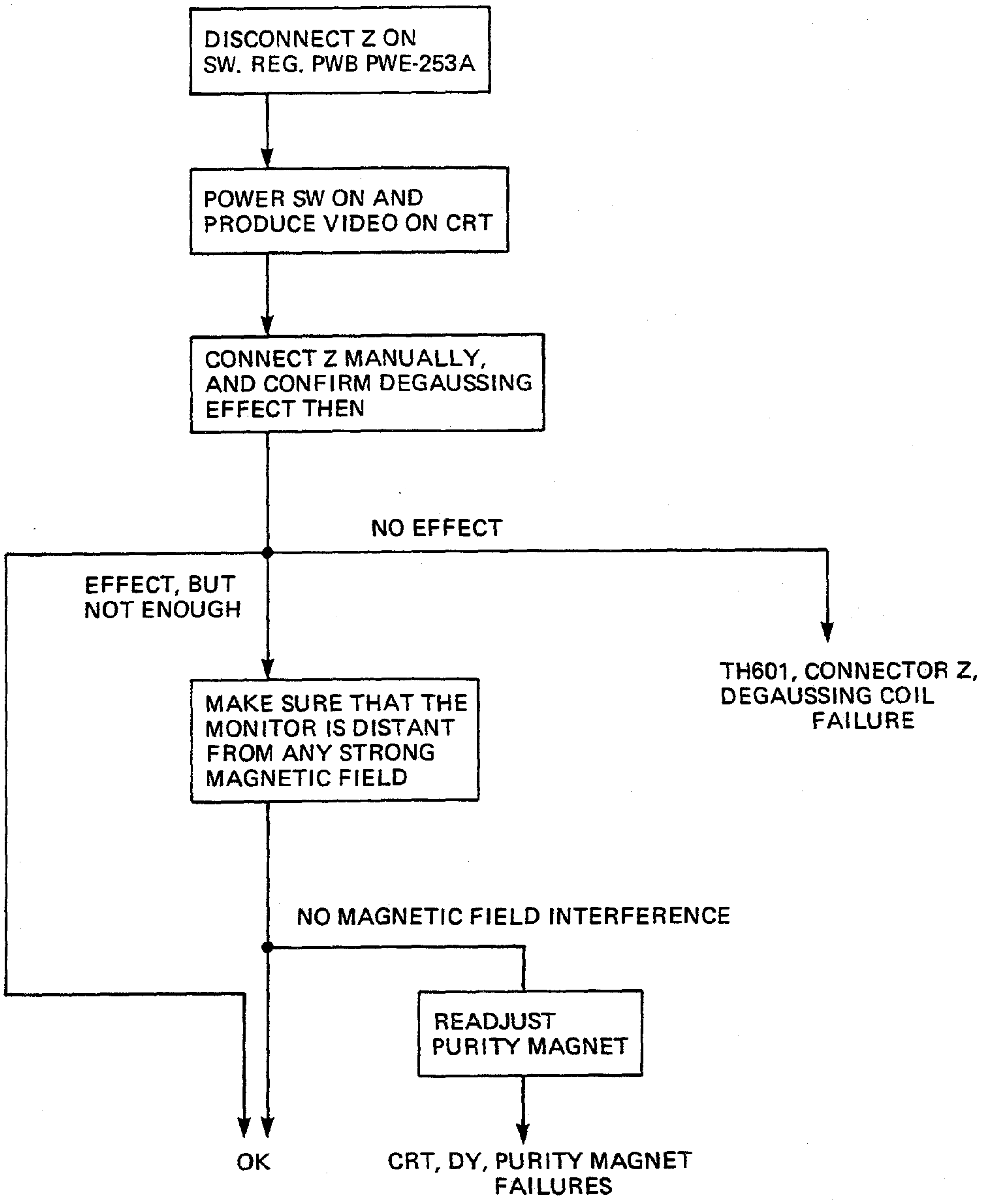
(5-7) SIDE PIN CUSHION DISTORTION FAILURE


READJUST
VR402 ON THE
DEF PWB
NG
IC512, IC403, Q401, Q406
T503, etc. FAILURE

(5-8) POOR FOCUS


READJUST
FOCUS CONTROL
NG
FOCUS CONTROL UNIT
FOCUS LEAD
CRT SOCKET
CRT
FAILURE

(5-9) IMPURITY ON CRT SCREEN


DISCONNECT Z ON SW. REG. PWB PWE-253A
POWER SW ON AND PRODUCE VIDEO ON CRT
CONNECT Z MANUALLY, AND CONFIRM DEGAUSSING EFFECT THEN
NO EFFECT
EFFECT, BUT NOT ENOUGH
TH601, CONNECTOR Z, DEGAUSSING COIL FAILURE
MAKE SURE THAT THE MONITOR IS DISTANT FROM ANY STRONG MAGNETIC FIELD
NO MAGNETIC FIELD INTERFERENCE
READJUST PURITY MAGNET
OK
CRT, DY, PURITY MAGNET FAILURES

THEORY OF OPERATION

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1. CONSTRUCTION

Multisync 3D consists of six major modules:

- (1-1) CRT
- (1-2) Power supply module
- (1-3) Deflection module
- (1-4) Interface module
- (1-5) Video module
- (1-6) Digital control module

(1-1) CRT

The CRT is a Vacuum Tube which generates focus beams of electrons that are deflected by the deflection yoke. These beams contact with the phosphor surface of the CRT produce light.
The fluorescent surface of the CRT has three different colors of phosphors. An electron gun which consist of the metal coil heater, a cathode, and five grids all mounted in line (on the same horizontal axis) on the same shaft. The three beams (Red, Green, and Blue) of the electron gun pass thru the shadow mask before stricking the phosphorus surface of the CRT. The shadow mask ensures that the beams will stricke only their corresponding phosphor colors on the screen.
A combination of Red, Green, and Blue phosphor dots stricked with the correct amplitude can produce any color.

(1-2) Power Supply Circuit

Many different D.C. power supply voltages are produced in the MS-3D.
The following is listing of them:

- a) +170V
- b) +85V
- c) +24V
- d) Variable main DC/DC converter output (+B line for H.OUT module)
- e) +18V
- f) +12V
- g) +6V
- h) +5V
- i) −12V
- j) −30V

Voltages a) thru c) are supplied by the Switching Regulator Unit (PWE-253A) and Voltages d) thru j) are generated on the MAIN PWB (PWE-248A; by using Voltages a) and c) line power as the source.

(1-3) Deflection Circuit

Consists of the following three circuits:

- a) Horizontal deflection
- b) Vertical deflection
- c) High voltage circuit for the CRT (Flyback Trans)

(1-4) Interface Circuit (SUB UNIT PWE-250)

It has the following three functions:

a) VIDEO Interface to the Video circuit
b) SYNC Interface for the Deflection circuit and the Digital control circuit
c) Digital Interface for the Digital control circuit

The sub unit sends an identification signal to the digital control circuit as to the type of PC or video graphics card to which the monitor is currently interfaced with.

(1-5) Video Circuit

The video signal sent by the Interface circuit is amplified by this circuit and supplied to the cathode of the CRT.

(1-6) Digital Control Circuit

The digital control circuit has the following functions: For a more detailed information please refer to the circuit description (2-5).

a) Automatic synchronization
b) Management of the displaying proper picture
    - Automatic signal identification
    - Automatic sizing
    - Automatic centering
    - Management of picture data
c) Management of user controls
d) Management of factory adjustment

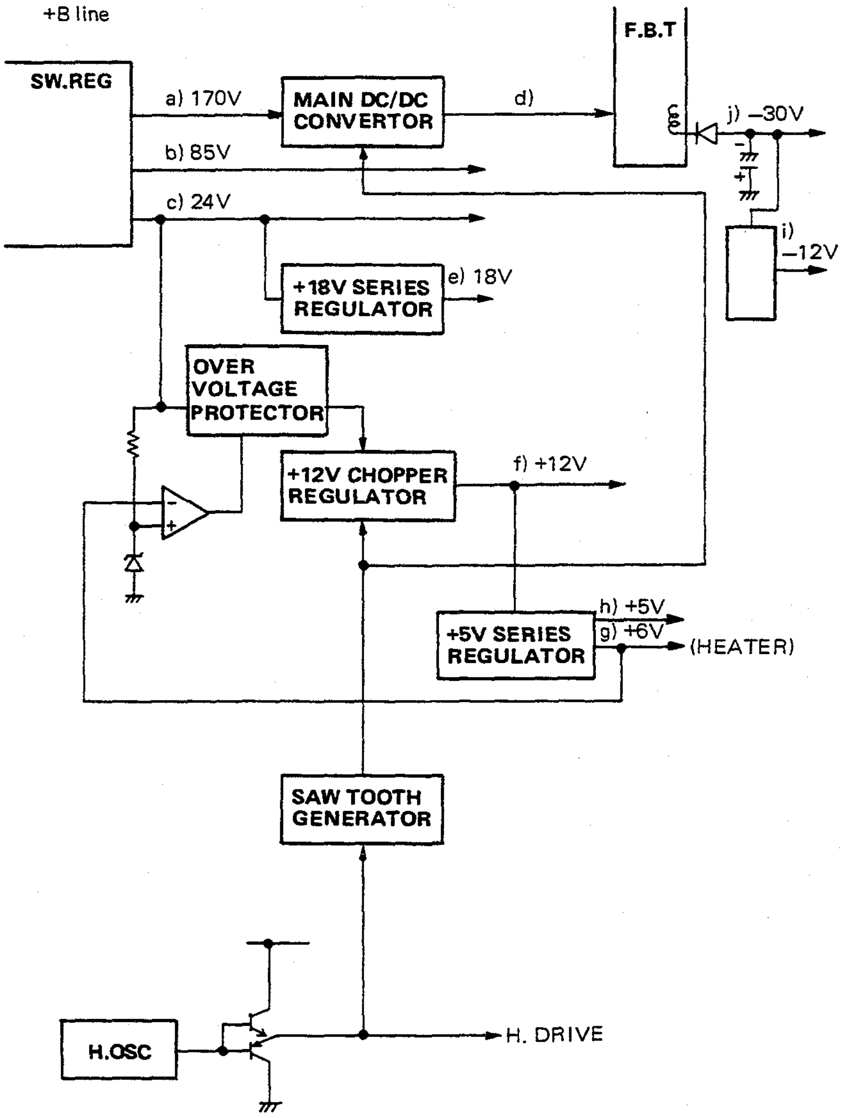
The following outputs are produced by the D/A (Digital to Analog) Converter (μPD6336C).

e) H-F/V converter output
f) V-F/V converter output
g) Horizontal size control output
h) Horizontal position control output
i) Vertical size control output
j) Vertical position control output

2. CIRCUIT DESCRIPTION

(2-1) Power Supply Circuit

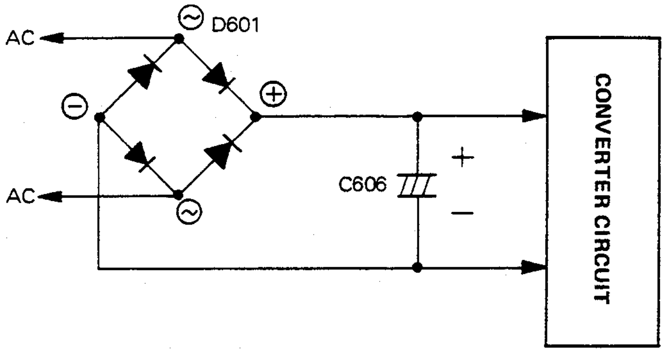
(Fig. 2-1) Block Diagram of the D.C. Power Supply of the MS-3D.


+B line
SW.REG
a) 170V
b) 85V
c) 24V
MAIN DC/DC CONVERTOR
d)
F.B.T
j) –30V
i) –12V
+18V SERIES REGULATOR
e) 18V
OVER VOLTAGE PROTECTOR
+12V CHOPPER REGULATOR
f) +12V
+5V SERIES REGULATOR
h) +5V
g) +6V
(HEATER)
SAW TOOTH GENERATOR
H.OSC
H. DRIVE

(2-1-1) SWITCHING REGULATOR UNIT

(a) Rectifying & filtering circuit

AC input is rectified by D601. Then, it is filtered by C606. The resulting DC voltage is supplied to the converter circuit.

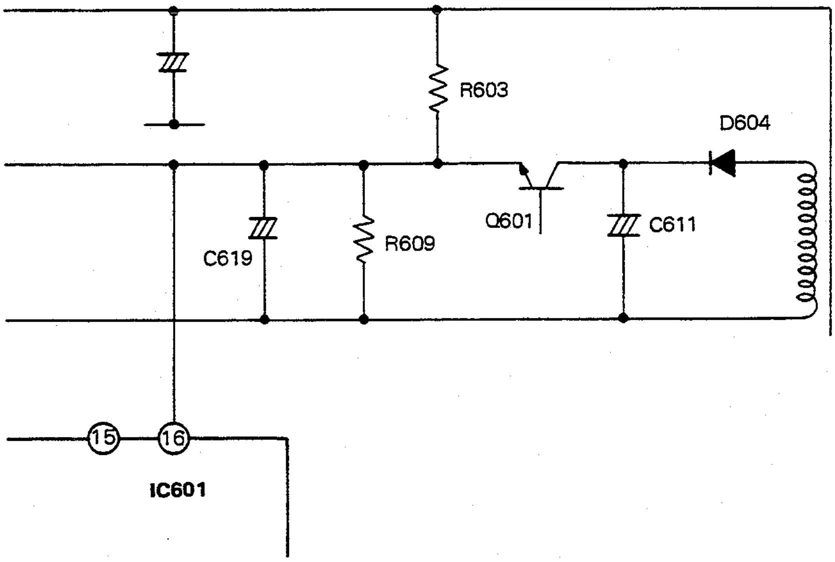


(Fig. 2-1-1) Rectifying & Filtering Circuit

(b) Auxiliary power supply circuit

The auxiliary power supply circuit is needed to activate IC601. At the time of power ON, charging current flows into the capacitor C619 via R603. Oscillation starts when the voltage of IC601 pin 16 reaches 17V by this charging operation.

After the start of oscillation, the foward voltage of the auxiliary coil for the switching transformer is rectified and filtered by D604 and C611, and regulated by Q601. The resultant DC voltage is supplied to IC601.

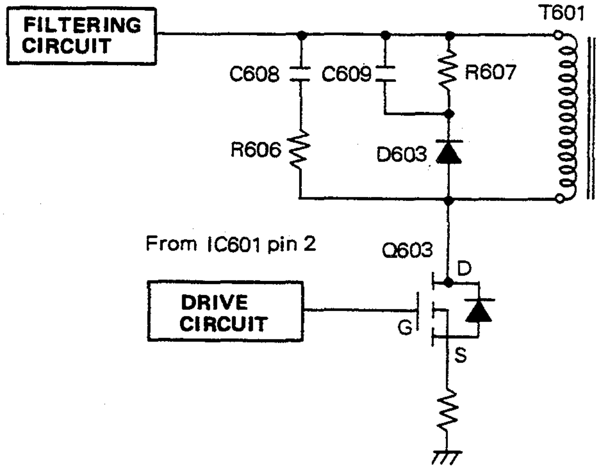


(Fig. 2-1-2) Auxiliary Power Supply Circuit

(c) Converter circuit

The converter circuit consists of the primary winding of the switching transformer T601, a switching device Q603, and surge absorbers (C608, R606, C609, D603, and R607) that are connected in serial to the primary winding.

The oscillating signal from IC601 pin 2 is applied to the gate of Q603 causing the drain-source to be turned on and off so that oscillating voltage is applied to the primary winding of T601.

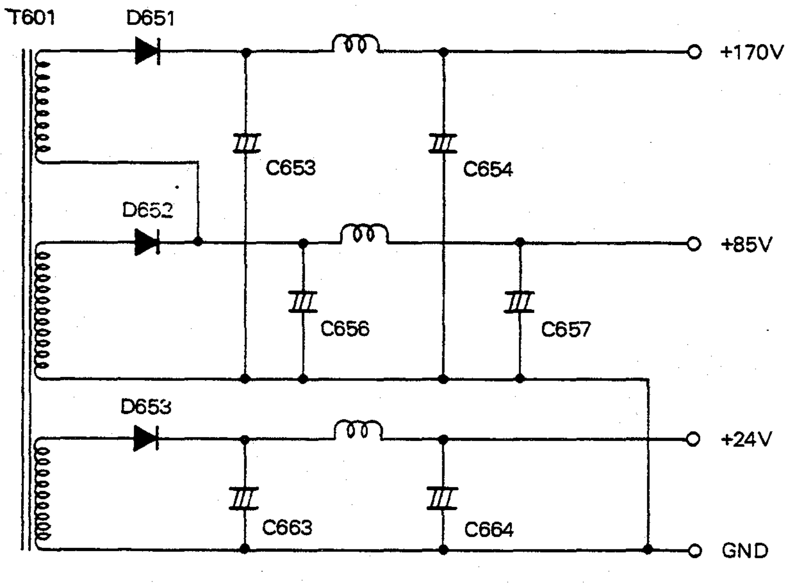

FILTERING CIRCUIT
T601
C608
C609
R607
R606
D603
From IC601 pin 2
Q603
D
DRIVE CIRCUIT
G
S

(Fig. 2-1-3) Converter Circuit

(d) Output filtering circuit

The fly-back voltage generated at the secondary windings of the switching transformer T601 are rectified by D651, D652, and D653. The, it is filtered by C653, C654, C656, C657, C663, and C664 so that rectified DC voltages are obtained.

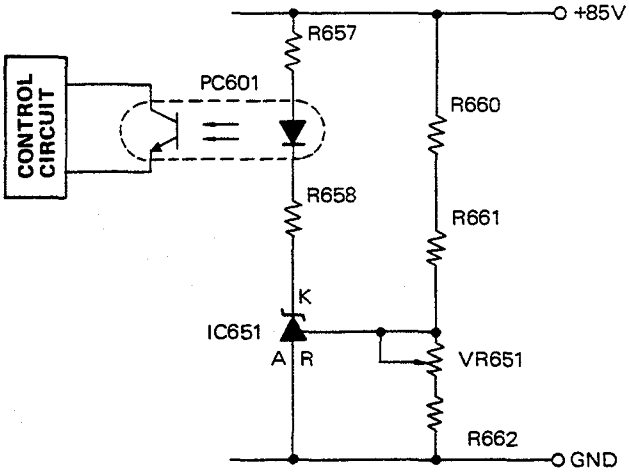
The fly-back voltage is constantly maintained by controlling the ON period duty cycle of Q603 in the converter circuit.


T601
D651
+170V
C653
C654
D652
+85V
C656
C657
D653
+24V
C663
C664
GND

(Fig. 2-1-4) Output Smoothing Circuit

(e) Error detection amplifier circuits

The output voltage 85V is divided by the network resistors. This divided voltage is compared to the reference voltage at the error amplifier IC651. An error signal is applied to the control circuit via the photocoupler PC601.


+85V
R657
CONTROL CIRCUIT
PC601
R660
R658
R661
K
IC651
A
R
VR651
R662
GND

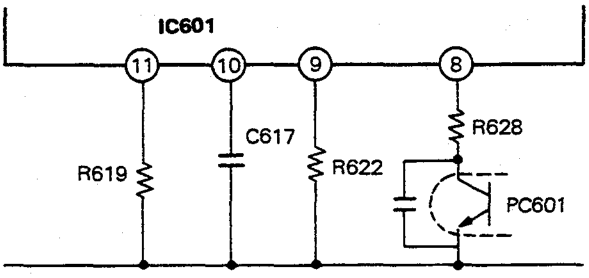
(Fig. 2-1-5) Error Detection Amplifier Circuit

(f) Oscillating circuit, control circuit, and drive circuit

The oscillating, control, and drive circuits are comprised in IC601.

IC601 has a built-in oscillator whose frequency is determined by R622, C617, and R619 connected to pins 9, 10, and 11, respectively.

The output of the error detection amplifier circuit is fed back to the control circuit from pin 8 via PC601 to control the duty cycle of Q603 so that output voltage is kept constant.

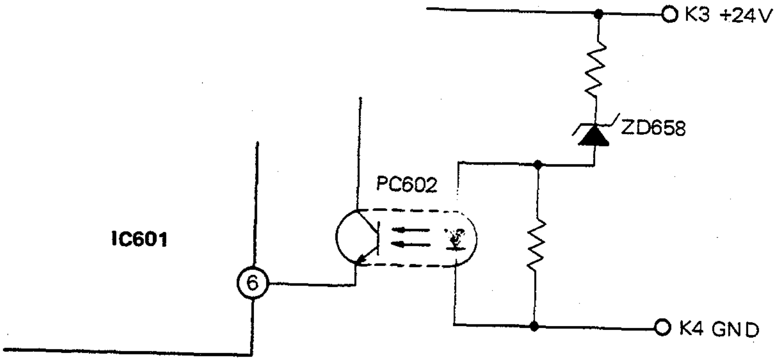

IC601
11
10
9
8
R628
C617
R622
R619
PC601

(Fig. 2-1-6) Oscillating & Control Circuits

(g) Overvoltage protection

If some failure occurs and the 24[V] line output increases beyond 29[V], the voltage at the output is sensed by the Zener Diode ZD658.

This Diode (ZD658) will activate the LED within the photocoupler PC602, turning on the transistor within it. Once the transistor is on, pin 6 of IC601 will go high, stopping the oscillation within this IC.



(Fig. 2-1-7) Overvoltage Protection Circuit

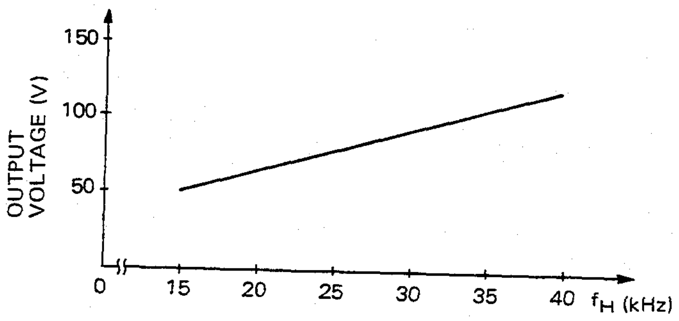
(2-1-2) MAIN DC/DC CONVERTER (d)

This converter's output is the power source for the Flyback Transformer. It is controlled by PWM method and synchronized by the Horizontal OSC. output.

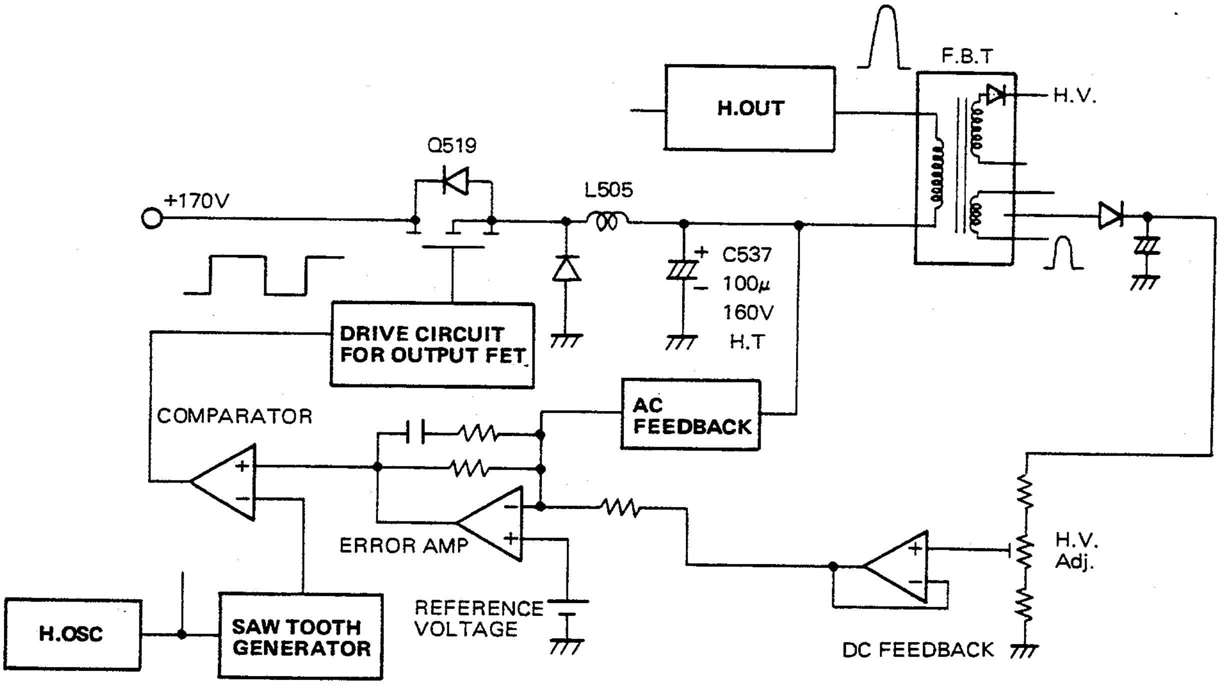
Output voltage of this converter is varied in respect to Horizontal OSC. frequency so that the voltage level of the Flyback pulse is constant for any frequency. This Constant Voltage level will also produce a constant Horizontal Raster size for any frequency. If H.OSC. stops the output of this converter will become low (in order to protect the CRT beam spot).

The relationship between Output Voltage and H.OSC. frequency is shown in Fig. 2-1-2a.

BLOCK DIAGRAM of this regulator is shown in Fig. 2-1-2b.



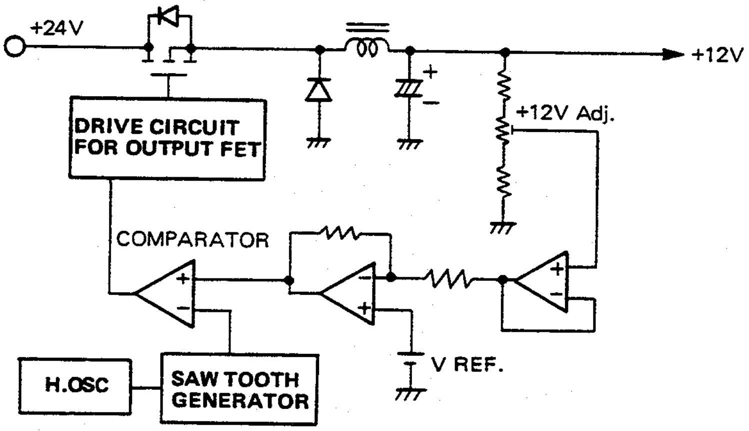
(Fig. 2-1-2 a) Relationship between the Output Voltage and the H.OSC. Frequency.


H.OUT
F.B.T
H.V.
Q519
+170V
L505
C537
100μ
160V
H.T
DRIVE CIRCUIT FOR OUTPUT FET
COMPARATOR
AC FEEDBACK
ERROR AMP
REFERENCE VOLTAGE
H.OSC
SAW TOOTH GENERATOR
H.V. Adj.
DC FEEDBACK

(Fig. 2-1-2b) BLOCK DIAGRAM of Main DC/DC Converter.

(2-1-3) +12V chopper regulator (f)

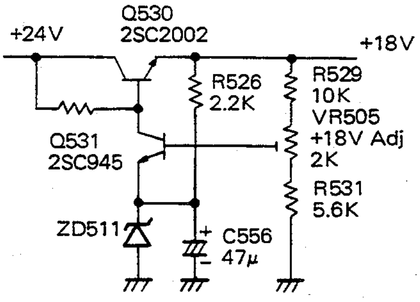
This regulator is PWM controlled and synchronized with the H.OSC. output of the DC/DC converter. The regulator's feedback circuit provides a constant and stable output voltage for any conditions (H.OSC. Frequency and +12V line load variations). If the H.OSC. operation stops, this output voltage will become low.
The BLOCK DIAGRAM is shown in Fig. 2-1-3.


+24V
+12V
+12V Adj.
DRIVE CIRCUIT FOR OUTPUT FET
COMPARATOR
V REF.
H.OSC
SAW TOOTH GENERATOR

(Fig. 2-1-3) BLOCK-DIAGRAM of +12V Regulator.

(2-1-4) +18V regulator (e)

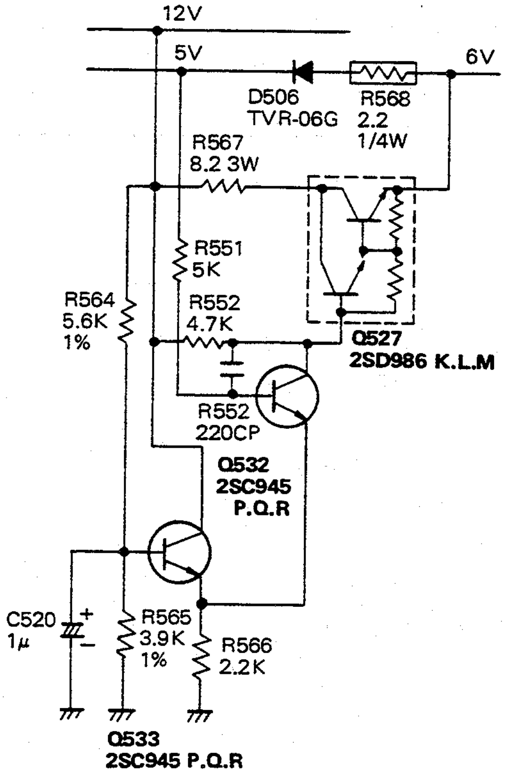
The H-F/V converter, the H.OSC., and the H.HOLD circuit are supplied by this voltage line. Therefore, this line requires an exact voltage of 18V±0.1V.



Q530
2SC2002
+24V
+18V
R526
2.2K
R529
10K
VR505
+18V Adj
2K
Q531
2SC945
R531
5.6K
ZD511
C556
47μ

(2-1-5) +5V regulator (g and h)

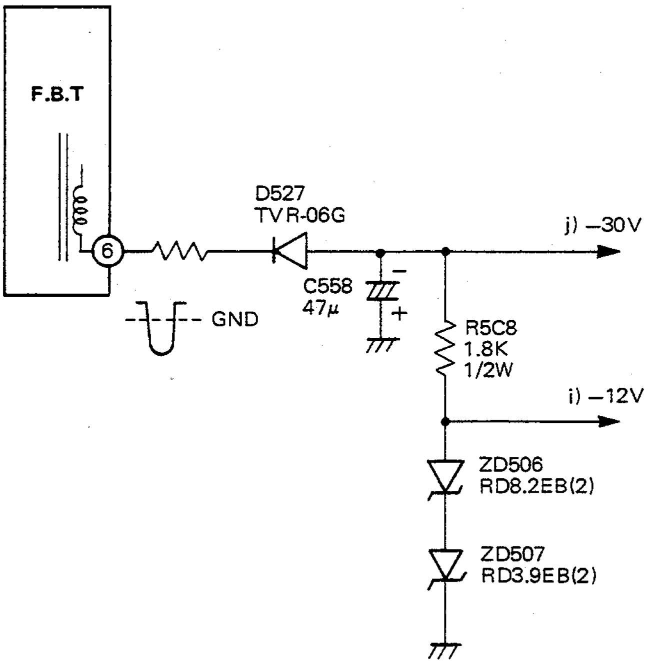
This circuit generates a +6V and a +5V from the +12V line.
The +6V is used for the CRT heater, and the +5V is for the digital control and the AFC feedback circuits.



12V
5V
6V
D506
TVR-06G
R568
2.2
1/4W
R567
8.2 3W
R551
5K
R552
4.7K
R564
5.6K
1%
Q527
2SD986 K.L.M
R552
220CP
Q532
2SC945
P.Q.R
C520
1μ
R565
3.9K
1%
R566
2.2K
Q533
2SC945 P.Q.R

(2-1-6) -12V and -30V lines (i and j)

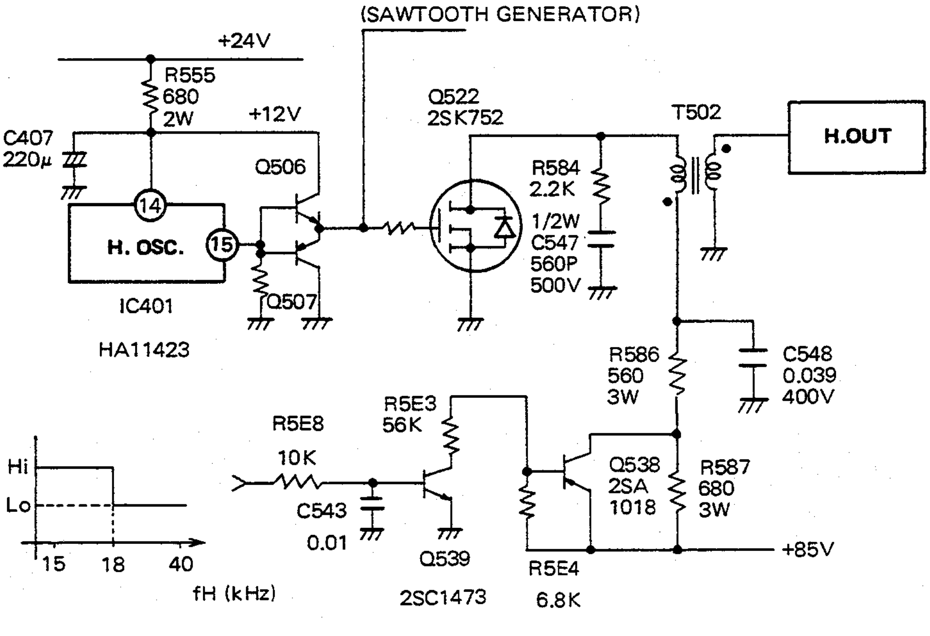
The −30V is produced by rectifing the flyback pulse. The −12V is produced by the reverse biasing of the zener diode.


F.B.T
6
D527
TVR-06G
j) −30V
C558
47µ
−
+
GND
R5C8
1.8K
1/2W
i) −12V
ZD506
RD8.2EB(2)
ZD507
RD3.9EB(2)

(2-2) Deflection Circuit

(2-2-1) HORIZONTAL DEFLECTION UNIT

(a) Horizontal drive circuit


(SAWTOOTH GENERATOR)
+24V
R555
680
2W
+12V
C407
220µ
14
H. OSC.
15
IC401
HA11423
Q506
Q507
Q522
2SK752
T502
H.OUT
R584
2.2K
1/2W
C547
560P
500V
R586
560
3W
C548
0.039
400V
R5E3
56K
R5E8
10K
C543
0.01
Q539
2SC1473
Q538
2SA
1018
R587
680
3W
R5E4
6.8K
+85V
Hi
Lo
15
18
40
fH (kHz)

The horizontal pre-drive pulse produce at IC401 pin 15 is applied to Q522. Then, it is amplified by T502 to turn on the horizontal output transistor Q523.

NOTE: When the horizontal frequency is less than 28 kHz, the power is supplied to T502 via R586 from the +85V line. And, when horizontal frequency is more than 28 kHz, the power is supplied via R586 and R587 from the +85V line.

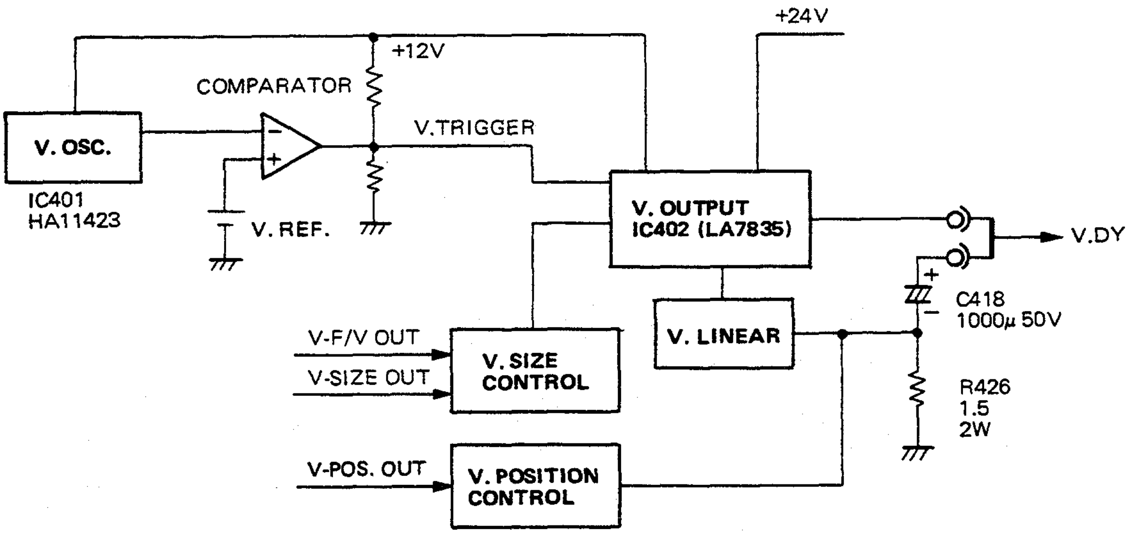
(b) Horizontal output circuit

This circuit produces a sawtooth current waveform to the Horizontal DY by switching Q523 and D522 ON and OFF. In order to meet wide a range of frequencies (15~38 kHz), several circuit and changed in corresponding frequency bands.

- Horizontal resonant capacitor . . . . . 17 kHz
- S-correction capacitor
  - $f_H \leqq 20$ kHz
  - $20 < f_H \leqq 27$ kHz
  - $27 < f_H \leqq 33$ kHz
  - $33 < f_H \leqq 38$ kHz
- Drive circuit of Q523 . . . . . 28 kHz

Due to this switching circuit and multiple DC outputs from the DC to DC converter circuit, the MS 3D can practically the same size raster and linearity for a wide range of frequencies.

(2-2-2) Vertical deflection circuit


+24V
+12V
COMPARATOR
V.TRIGGER
V. OSC.
IC401
HA11423
V. REF.
V. OUTPUT
IC402 (LA7835)
V.DY
C418
1000μ 50V
V-F/V OUT
V-SIZE OUT
V. SIZE
CONTROL
V. LINEAR
R426
1.5
2W
V-POS. OUT
V. POSITION
CONTROL

(Fig. 2-2-2) BLOCK DIAGRAM of vertical deflection

The vertical deflection circuit produces a sawtooth current waveform to the vertical D.Y. The output of IC402 (LA7835) is suited for multi-scanning monitors because it easily controls the vertical size (by DC control) and is also easy to synchronize.

(2-2-3) H.V. circuit

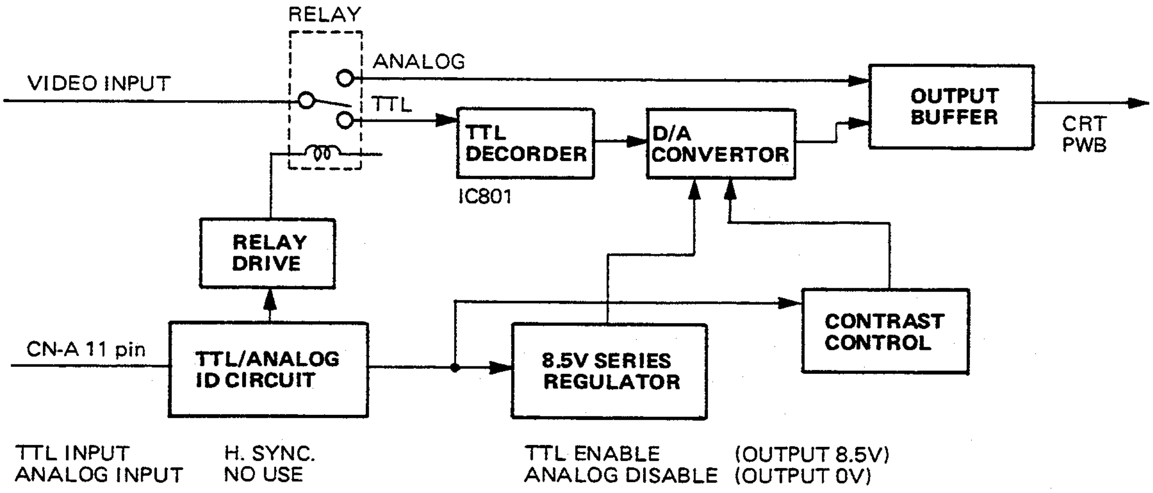
The H.V. circuit supplies high voltage (23.5 kV) to the anode of the CRT. This circuit is composed of the fly-back transformer and the H. out circuit. The energy is stopped on the primary coil of F.B.T. when the H. output transistor Q523 is turned ON. This energy is transformed through the F.B.T. when it is turned OFF. The high voltage generated by the secondary coil is rectified 23.5 kV. This voltage is controlled by VR504. The high voltage circuit has two high voltage protection circuits to meet the D.H.H.S. standards.

The first circuit is IC401's (HA11423) internal protection circuit. If the high voltage increase, the voltage at TP2005 increase. When TP2005 voltage exceeds 0.7V, IC401's protection circuit turns ON and the H. OSC. is stopped.

The second circuit's operation is similar to the one described.

(2-3) Interface Circuit (PWE-250)

(2-3-1) Video Interface Circuit


RELAY
ANALOG
VIDEO INPUT
TTL
TTL DECORDER
IC801
D/A CONVERTOR
OUTPUT BUFFER
CRT PWB
RELAY DRIVE
CONTRAST CONTROL
CN-A 11 pin
TTL/ANALOG ID CIRCUIT
8.5V SERIES REGULATOR
TTL INPUT
ANALOG INPUT
H. SYNC.
NO USE
TTL ENABLE
ANALOG DISABLE
(OUTPUT 8.5V)
(OUTPUT 0V)

(Fig. 2-3-1) BLOCK DIAGRAM of the Video Interface

- TTL/ANALOG identification circuit

This circuit monitors the signal on pin 11 of CN-A. If there is a Horizontal pulse, the MS 3D assume that TTL Video is connected to it. The TTL/ANALOG ID output controls relays RL801 and RL802 and the 8.5V series regulator.

In case of ANALOG video input, the relays enable the ANALOG circuit and the 8.5V line, and disables the TTL enable circuit.

In case of TTL video input, the relays enable the TTL circuit, the video information is passed to the TTL decoder (IC801). This TTL decoder IC produces signals based on the MODE and color switch settings.

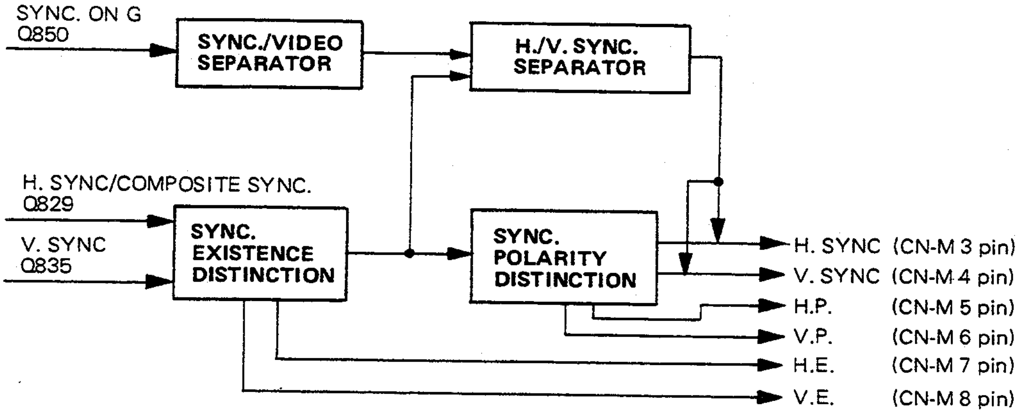
The maximum output of the D/A converter is 0.7 Vp-p.

The output level of the D/A converter is controlled by the CONTRAST VR only when a TTL video signal is the video source.

(2-3-2) Sync Interface Circuit

(a) The outputs of this circuit are positive H. SYNC. and V. SYNC. for the following inputs:

(i) SEPARATE SYNC	POSITIVE/NEGATIVE polarity
(ii) COMPOSITE SYNC	POSITIVE/NEGATIVE polarity
(iii) SYNC. ON GREEN	NEGATIVE polarity


SYNC. ON G
Q850
SYNC./VIDEO SEPARATOR
H./V. SYNC. SEPARATOR
H. SYNC/COMPOSITE SYNC.
Q829
V. SYNC
Q835
SYNC. EXISTENCE DISTINCTION
SYNC. POLARITY DISTINCTION
H. SYNC (CN-M 3 pin)
V. SYNC (CN-M 4 pin)
H.P. (CN-M 5 pin)
V.P. (CN-M 6 pin)
H.E. (CN-M 7 pin)
V.E. (CN-M 8 pin)

(Fig. 2-3-2) BLOCK DIAGRAM of the Sync. Interface Circuit

(i) For the separate sync. mode, the horizontal and vertical synchronization signals are supplied to the SYNC. EXISTENCE DISTINCTION and to the SYNC. POLARITY DISTINCTION circuits. The outputs after these circuits are a positive H. sync. and a negative V. sync.

(ii) For the composite sync. mode, the composite synchronization signal is applied to the H./V. SYNC SEPARATOR circuit from the SYNC. EXISTENCE DISTINCTION circuit.

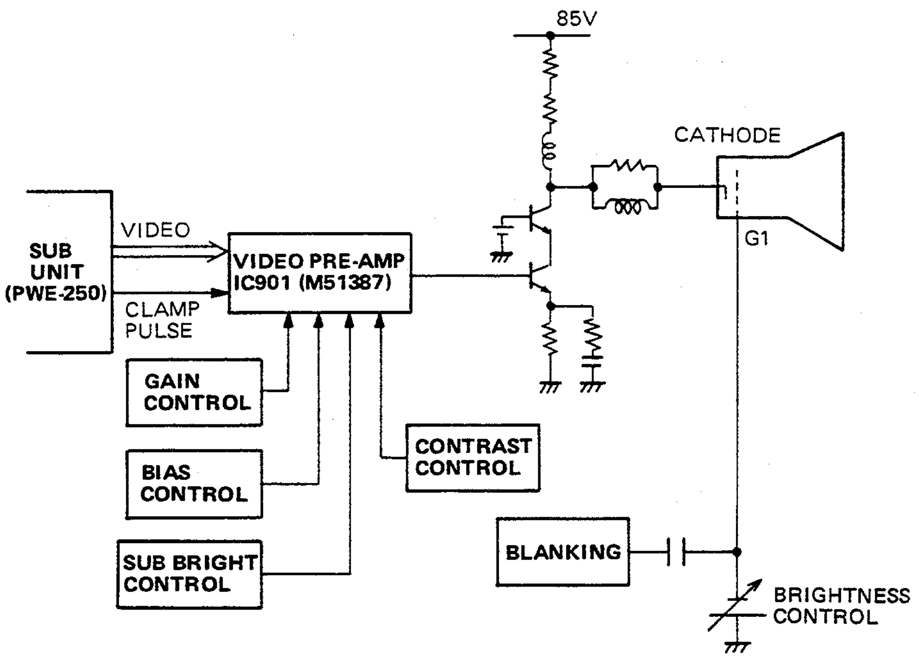
(iii) For the sync. on green analog mode, the green signal is applied to the SYNC./VIDEO SEPARATOR circuit which produces a composite synchronization signal. And then, it is the same as for the composite sync. mode.

(b) The outputs of the distinction circuit are as follows:
These outputs are applied to IC151 (CPU) on the main PWB.

● TTL/ANALOG Identification signal (CN-M 5 pin)	L: ANALOG H: TTL
● H. SYNC. signals's polarity (CN-M 6 pin)	L: POSITIVE POLARITY H: NEGATIVE POLARITY
● V. SYNC. signal's polarity (CN-M 7 pin)	L: POSITIVE POLARITY H: NEGATIVE POLARITY
● H. SYNC. availability (CN-M 8 pin)	L: NONE H: AVAILABLE
● V. SYNC. availability (CN-M 9 pin)	L: NONE H: AVAILABLE
● Mode signal (CN-M 10 pin)	L: NORMAL H: MDA/USER MODE

NOTE: L . . . Low level of TTL
H . . . High level of TTL

(2-4) Video Circuit


85V
CATHODE
G1
SUB UNIT (PWE-250)
VIDEO
CLAMP PULSE
VIDEO PRE-AMP IC901 (M51387)
GAIN CONTROL
BIAS CONTROL
SUB BRIGHT CONTROL
CONTRAST CONTROL
BLANKING
BRIGHTNESS CONTROL

(Fig. 2-4-1) BLOCK DIAGRAM of the Video Module

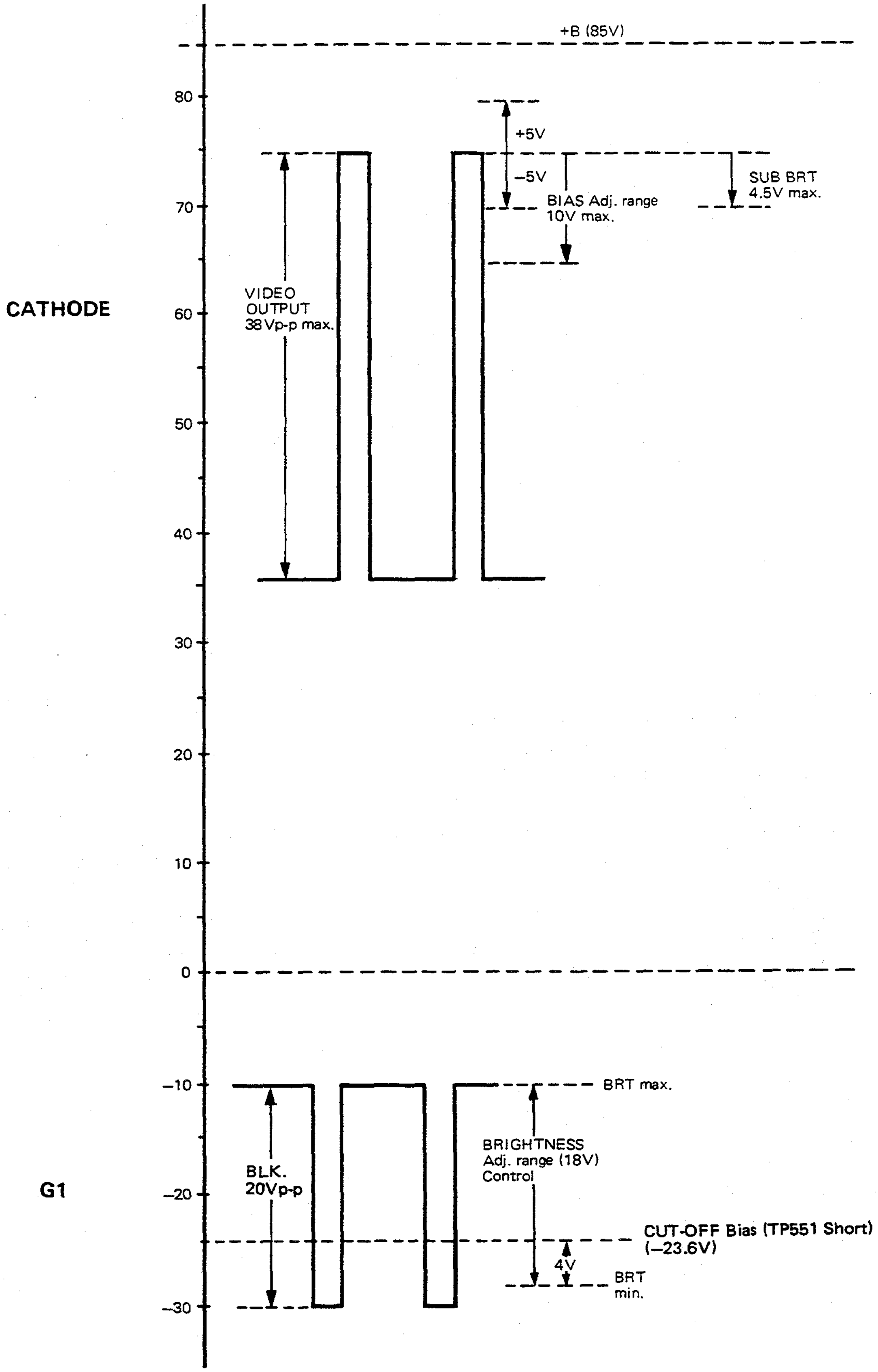
The video pre-amplifier consists of the pre-amp IC901 (M51387), the gain control, the bias control circuit, the sub-brightness control circuit, and the contrast control circuit.

This pre-amplifier has two function. The first is to control the video signal output level by the gain, the contrast, and sub-brightness controls. After the gain and the contrast controls have been adjusted, the video signals output levels at the CRT cathodes are 38 Vp-p for the contrast control at the maximum position and 10 Vp-p for the contrast control at the minimum position.

For the TTL video signal mode, the contrast control and the video pre-amp gain are fixed and can not be adjusted.

The second function is the alignment of the cut-off for the CRT by the adjustment of the Bais and Sub-Brightness controls. By adjusting these controls properly, the raster color will be white for any position of the Brightness control (the Sub-Brightness control is controlled by the Brightness control).

(Fig. 2-4-2) CRT G1-Cathode Bias Condition

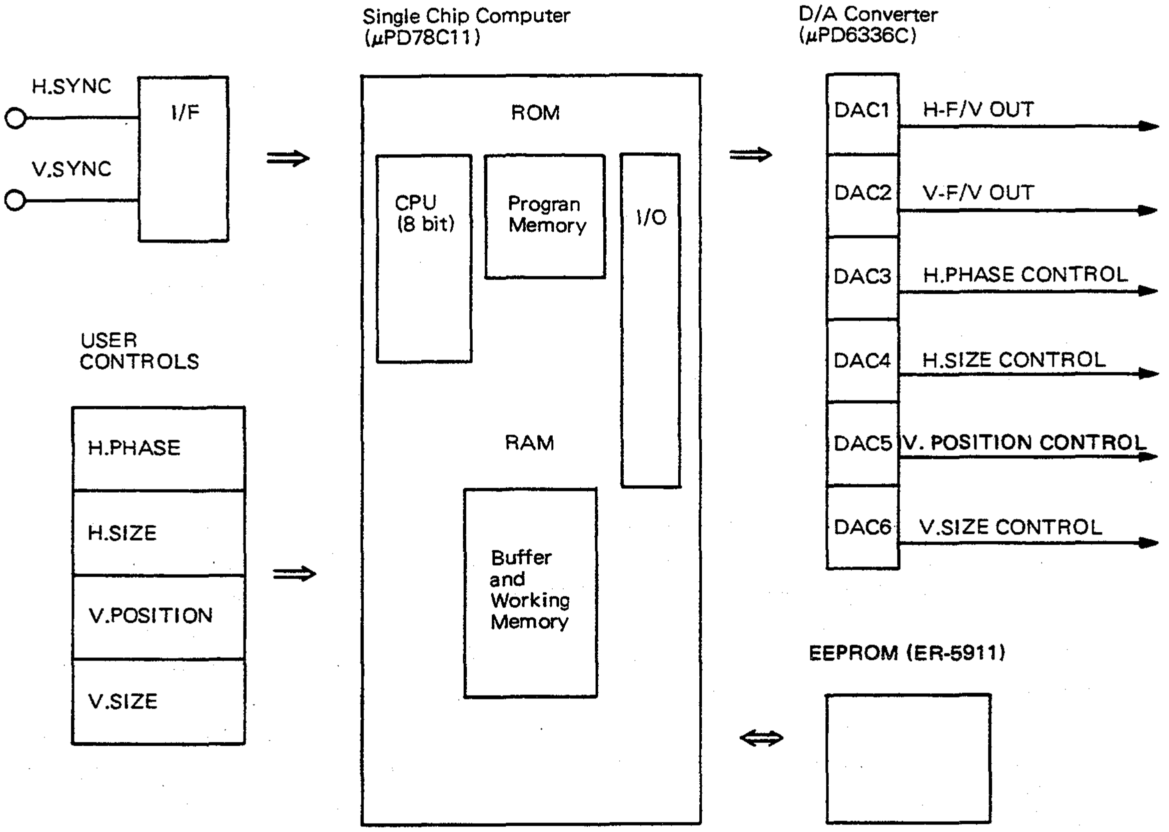

+B (85V)
80
70
60
50
40
30
20
10
0
−10
−20
−30
CATHODE
G1
+5V
−5V
BIAS Adj. range
10V max.
SUB BRT
4.5V max.
VIDEO
OUTPUT
38Vp-p max.
BRT max.
BRIGHTNESS
Adj. range (18V)
Control
BLK.
20Vp-p
CUT-OFF Bias (TP551 Short)
(−23.6V)
4V
BRT
min.

(2-5) Digital Control Circuit

(2-5-1) Digital Control Unit

Digital Control System

- Automatic Synchronization
- Management of displaying proper picture
  - Automatic signal identification
  - Automatic Sizing
  - Automatic Centering
  - Management of Picture Data
- Management of user controls
- Management of factory Adjustment


(Fig. 2-5-1) The BLOCK DIAGRAM of Digital Control System

Single Chip Computer
(μPD78C11)
D/A Converter
(μPD6336C)
H.SYNC
V.SYNC
I/F
ROM
CPU
(8 bit)
Progran
Memory
I/O
RAM
Buffer
and
Working
Memory
USER
CONTROLS
H.PHASE
H.SIZE
V.POSITION
V.SIZE
DAC1
H-F/V OUT
DAC2
V-F/V OUT
DAC3
H.PHASE CONTROL
DAC4
H.SIZE CONTROL
DAC5
V. POSITION CONTROL
DAC6
V.SIZE CONTROL
EEPROM (ER-5911)

1. Automatic Synchronization

The monitor automatically synchronizes for the following frequency range.

Fh: 15.5 kHz to 38.0 kHz
Fv: 50.0 Hz to 90.0 Hz

The CPU counts the horizontal pulses during a given period of time and vertical period. After these measurements, the corresponding digital data are produced and converted by the DAC to analog voltage. This combination of the CPU and DAC produce frequency to voltage (F/V) converter. The analog voltage is used as the control signal for the automatic synchronizing circuitry.

2. Automatic Display

a. Automatic signal identification

The CPU checks the input signal (TTL or ANALOG video, separate or composite SYNC, SYNC polarity, and etc.) and automatically identifies this input signal.

*See the Fig. 2-5-2 for the Signal Identification Flowchart.

b Automatic centering and sizing

After the CPU identifies the input signal, the CPU send the stored digital data from the corresponding memory block in the EE-PROM. The EE-PROM has several memory blocks which consist of the control data for horizontal and vertical, centering and sizing. The control data is converted to the analog voltage by the DAC and is used by control signal.

The EE-PROM data is adjusted for the several standard signals (see Fig. 2-5-4) at the factory to get the optimum video display area. When the end user connects a standard signal (i.e. VGA. EGA etc.), the monitor will display the centered active video area with suitable size automatically.

c. User controls

The user can change the control data (display size and location) by pushing the proper user control bottons. After a few seconds, the CPU will automatically store data in the EE-PROM. The user can reset the data of the memory area and recall the initial data.

In case the user has a 3rd party's compatible board, small adjustments by the user control bottons may be needed at the initial start up. This data information is again stored in the memory. No adjustments are necessary after initial start up, if the same video signal is re-used.

In case a completely different video signal is applied to the monitor, the CPU will identify the signal and select a memory block accordingly. If the display size and location are not satisfactory, the user can adjust the display and after 5 seconds the CPU will again store the control data into the memory.

d. Factory Adjustment

In order to simplify the display adjustments, the CPU has the PRESET factory data in its ROM. At the beginning of the adjustment process, the CPU writes the PRESET factory data from the ROM to the buffer RAM and then outputs them to the D/A converter. Then, the monitor is roughly adjusted for the display size and location.

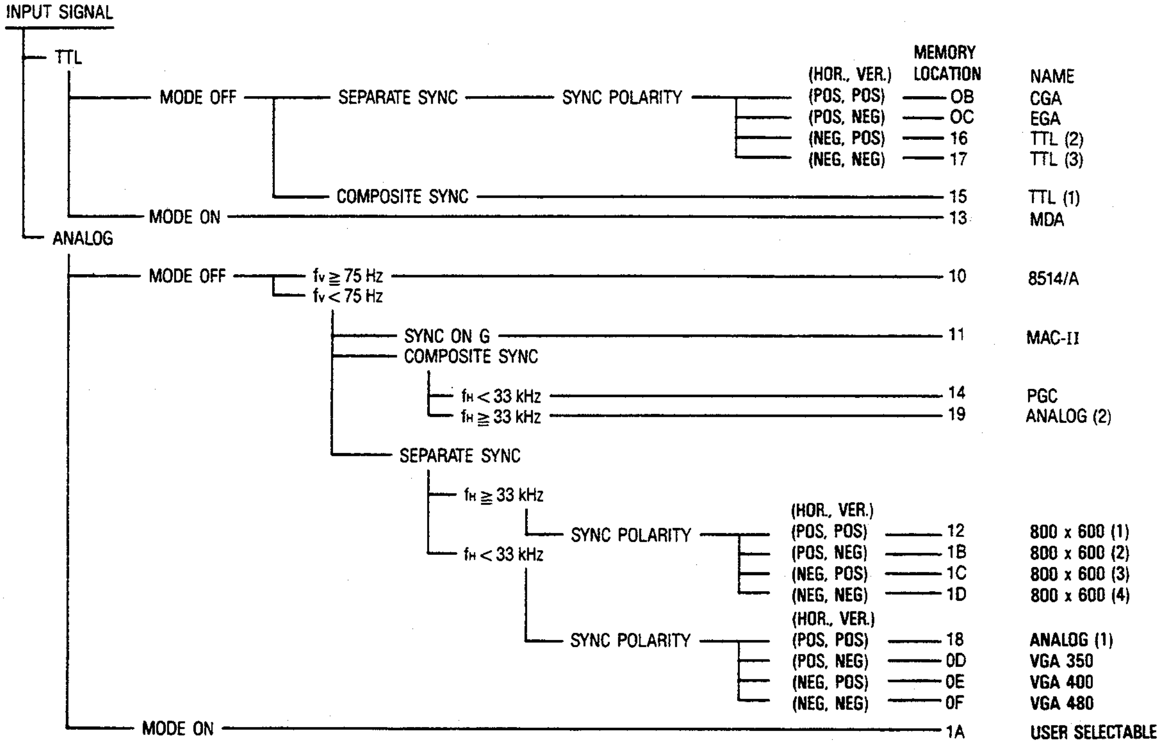
The fine adjustments are then made by adjusting the user controls by the factory personnel.

*Final adjustment process for the display size and location.

1. Prepare for the adjustment mode by shorting TP151 and TP152. The CPU applies the PRESET factory data to the buffer RAM and then to the D/A converter.

2. Adjust the active video area to the center and the specified size by pushing the user control buttons changing the data of the buffer RAM.
3. Store these control data to the EE-PROM by pushing the memory recall button.

(Fig. 2-5-2) SIGNAL IDENTFICATION FLOW of the MS-III


INPUT SIGNAL
TTL
MODE OFF
SEPARATE SYNC
SYNC POLARITY
(HOR., VER.)
MEMORY LOCATION
NAME
(POS, POS) OB CGA
(POS, NEG) OC EGA
(NEG, POS) 16 TTL (2)
(NEG, NEG) 17 TTL (3)
COMPOSITE SYNC 15 TTL (1)
MODE ON 13 MDA
ANALOG
MODE OFF
fv ≧ 75 Hz 10 8514/A
fv < 75 Hz
SYNC ON G 11 MAC-II
COMPOSITE SYNC
fH < 33 kHz 14 PGC
fH ≧ 33 kHz 19 ANALOG (2)
SEPARATE SYNC
fH ≧ 33 kHz
SYNC POLARITY
(HOR., VER.)
(POS, POS) 12 800 x 600 (1)
(POS, NEG) 1B 800 x 600 (2)
(NEG, POS) 1C 800 x 600 (3)
(NEG, NEG) 1D 800 x 600 (4)
fH < 33 kHz
SYNC POLARITY
(HOR., VER.)
(POS, POS) 18 ANALOG (1)
(POS, NEG) 0D VGA 350
(NEG, POS) 0E VGA 400
(NEG, NEG) 0F VGA 480
MODE ON 1A USER SELECTABLE

(Fig. 2-5-3) METHOD OF SIGNAL IDENTIFICATION

MEMORY LOCATION	TTL/ANALOG 0: ANALOG 1: TTL	H.S.POLARITY 0: POS 1: NEG	V.S.POLARITY 0: POS 1: NEG	H. SYNC 0: NO SYNC 1: AVAILABLE	V. SYNC 0: NO SYNC 1: AVAILABLE	MODE 0: OFF 1: ON	f_H Band Select f_V			Band Select			NAME
							15k	33k	38k	40	75	100	
0B	1	0	0	1	1	0	○			○			CGA
0C	1	0	1	1	1	0	○		○	○			EGA
0D	0	0	1	1	1	0	○			○			VGA 350
0E	0	1	0	1	1	0	○			○			VGA 400
0F	0	1	1	1	1	0	○			○			VGA 480
10	0	X	X	X	X	0		X				○	8514A
11	0	X	X	0	0	0		X		○			MAC-II (ANALOG/ SYNC. ON G
12	0	0	0	1	1	0			○	○			800 x 600(1)
13	1	X	X	X	X	1	○			○			MDA
14	0	X	X	1	0	0	○			○			PGC (ANALOG CS f_H <33kHz)
15	1	X	X	1	0	0	○			○			TTL (1)
16	1	1	0	1	1	0	○			○			TTL (2)
17	1	1	1	1	1	0	○			○			TTL (3)
18	0	0	0	1	1	0		X		○			ANALOG (1)
19	0	X	X	1	0	0			○	○			ANALOG (2)
1A	0	X	X	X	X	1			○	○			USER SELECT SELECTABLE
1B	0	0	1	1	1	0			○	○			800 x 600(2)
1C	0	1	0	1	1	0			○	○			800 x 600(3)
1D	0	1	1	1	1	0			○	○			800 x 600(4)

(Fig. 2-5-4) EE-PROM MEMORY MAP

Memory type: 128 word x 8 bit (1k byte)
SERIAL EE-PROM

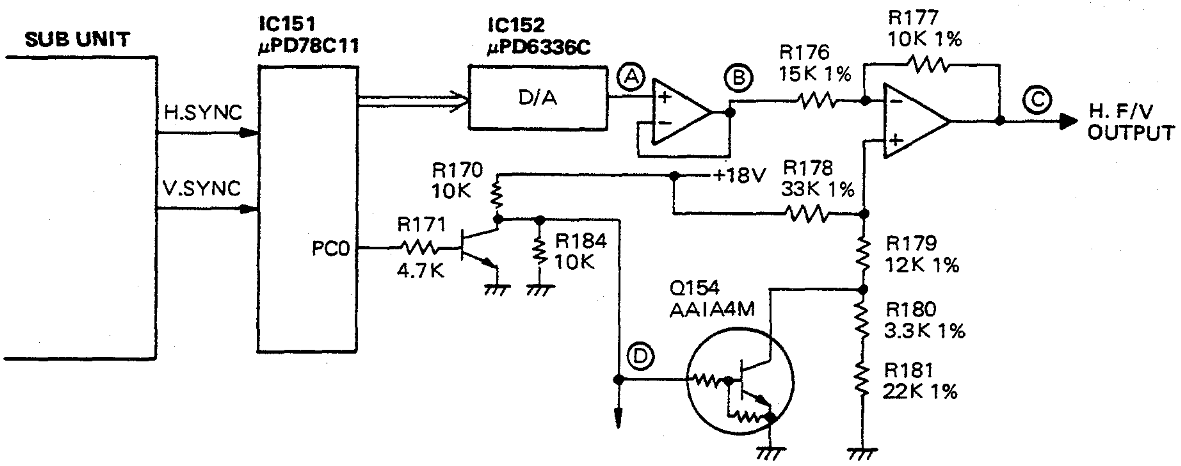
Address

MEMORY Block-LOCATION	NAME	H. PHASE	H. SIZE	V. POSITION	V. SIZE	
01	CGA	00	01	02	03	Factory set data for the standard SIGNALS (Back up memory data stored in the ROM) Can be changed only by the service person
02	EGA	04	05	06	07	
03	VGA 350	08	09	0A	0B	
04	VGA 400	0C	0D	0E	0F	
05	VGA 480	10	11	12	13	
06	8514A	14	15	16	17	
07	MAC-II	18	19	1A	1B	
08	800 x 600	1C	1D	1E	1F	
09	MDA	20	21	22	23	
0A	PGC	24	25	26	27	
	(INITIAL DATA)					
0B	CGA	30	31	32	33	Pre-set to the same data as memory blocks locations 01 to 0A by the factory and can be changed by user controls. These data can be reset to the initial data by using the standard data load switch.
0C	EGA	34	35	36	37	
0D	VGA 350	38	39	3A	3B	
0E	VGA 400	3C	3D	3E	3F	
0F	VGA 480	40	41	42	43	
10	8514A	44	45	46	47	
11	MAC-II	48	49	4A	4B	
12	800 x 600(1)	4C	4D	4E	4F	
13	MDA	50	51	52	53	
14	PGC	54	55	56	57	
15	TTL (1)	58	59	5A	5B	Can be changed only by the user controls
16	TTL (2)	5C	5D	5E	5F	
17	TTL (3)	60	61	62	63	
18	ANALOG (1)	64	65	66	67	
19	ANALOG (2)	68	69	6A	6B	
1A	USER SELECTABLE	6C	6D	6E	6F	
1B	800 x 600(2)	70	71	72	73	
1C	800 x 600(3)	74	75	76	77	
1D	800 x 600(4)	78	79	7A	7B	

TTL (1): TTL COMPOSITE SYNC
TTL (2): TTL H-SYNC NEGATIVE and V-SYNC POSITIVE
TTL (3): TTL H-SYNC NEGATIVE and V-SYNC NEGATIVE
ANALOG (1): $f_H < 33$kHz, ANALOG, H-SYNC POSITIVE, and V-SYNC POSITIVE
ANALOG (2): ANALOG COMPOSIT SYNC $f_H \leqq 33$kHz

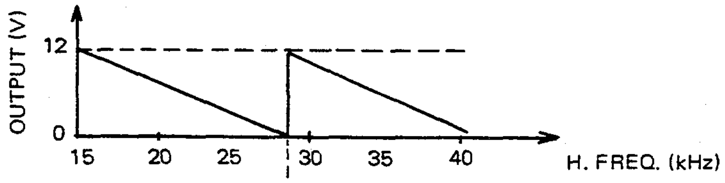
(2-5-2) H. F/V Converter

1. BLOCK DIAGRAM

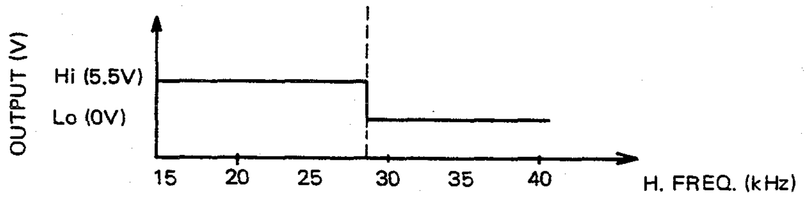

SUB UNIT
IC151
μPD78C11
IC152
μPD6336C
D/A
H.SYNC
V.SYNC
PCO
Ⓐ
Ⓑ
Ⓒ
Ⓓ
R176
15K 1%
R177
10K 1%
R170
10K
R171
4.7K
R184
10K
+18V
R178
33K 1%
R179
12K 1%
Q154
AAIA4M
R180
3.3K 1%
R181
22K 1%
H. F/V
OUTPUT

(Fig. 2-5-5) BLOCK DIAGRAM of H. F/V Converter

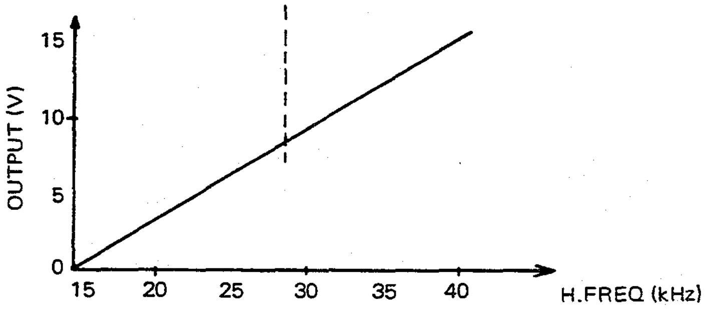
2. Relationship between voltage and horizontal frequency



(Fig. 2-5-6) Relationship between Points Ⓐ and Ⓑ

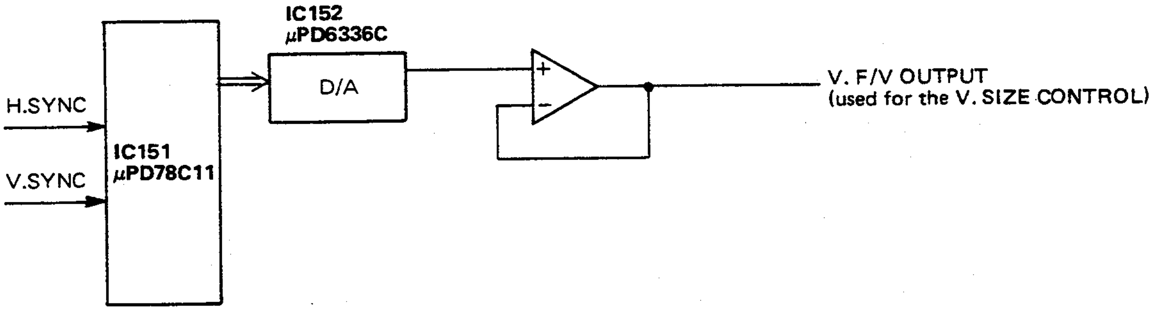


(Fig. 2-5-6) Relationship between Point Ⓓ and H. Frequency

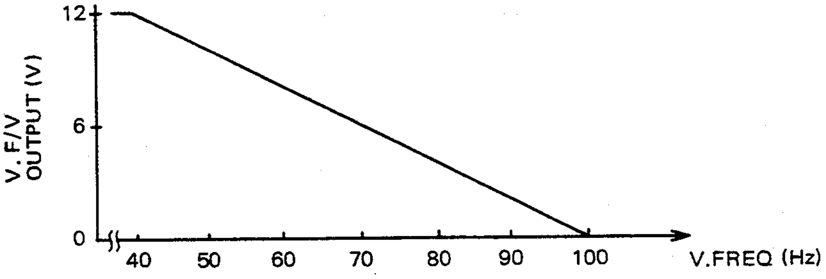


(Fig. 2-5-7) H. F/V Output (Point Ⓒ)

(2-5-3) V-F/V converter


IC152
μPD6336C
D/A
H.SYNC
V.SYNC
IC151
μPD78C11
V. F/V OUTPUT
(used for the V. SIZE CONTROL)

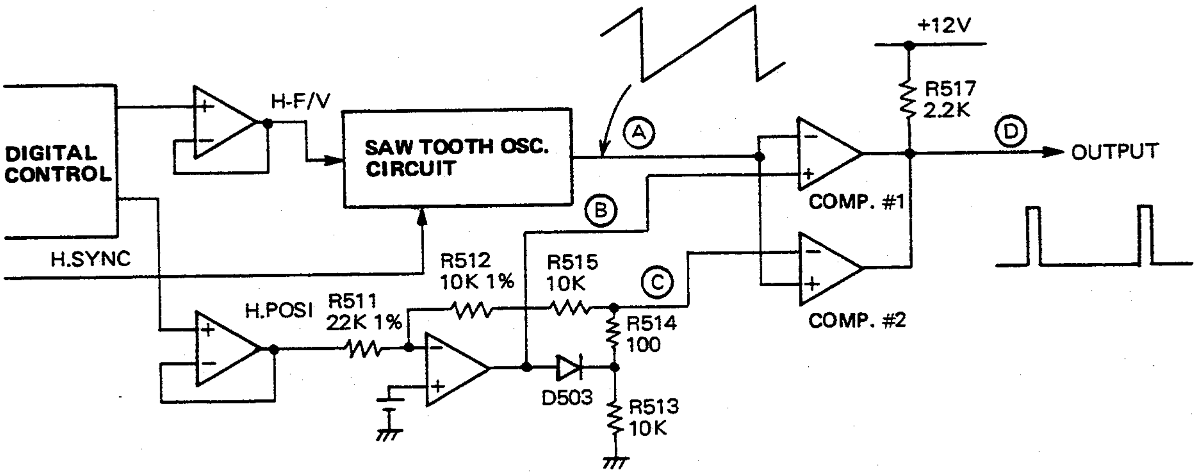
(Fig. 2-5-8) BLOCK DIAGRAM of V. F/V converter



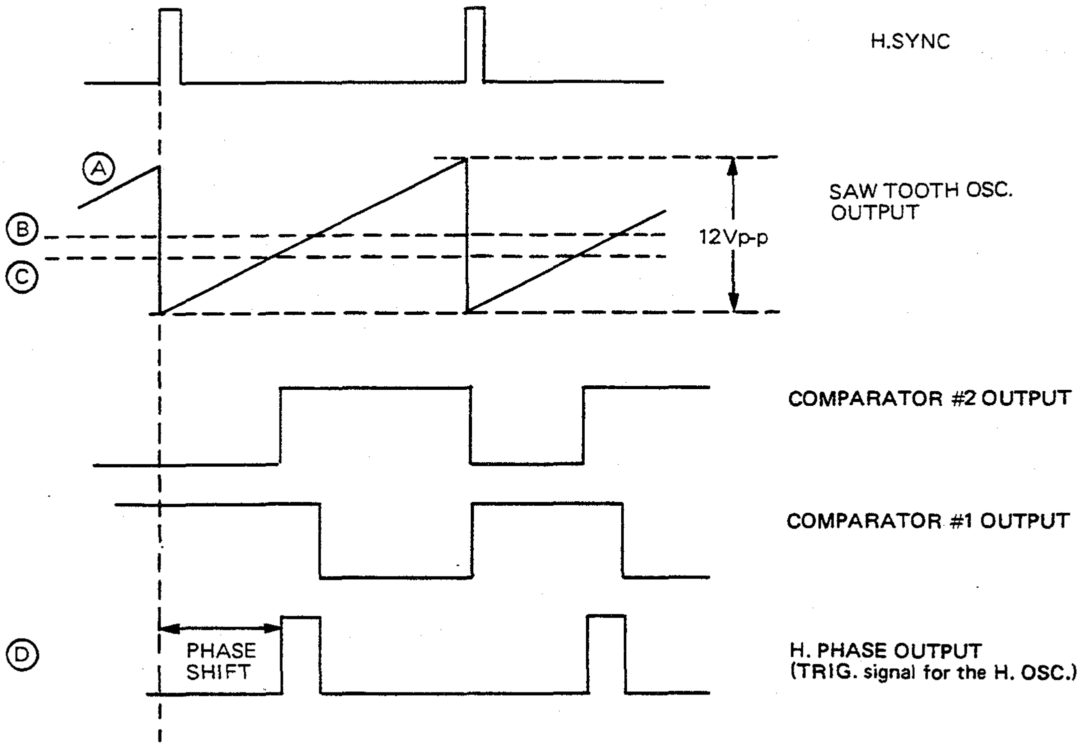
(Fig. 2-5-9) Relationship between output voltage and V. Frequency

(2-5-4) H. Phase circuit

1. BLOCK DIAGRAM

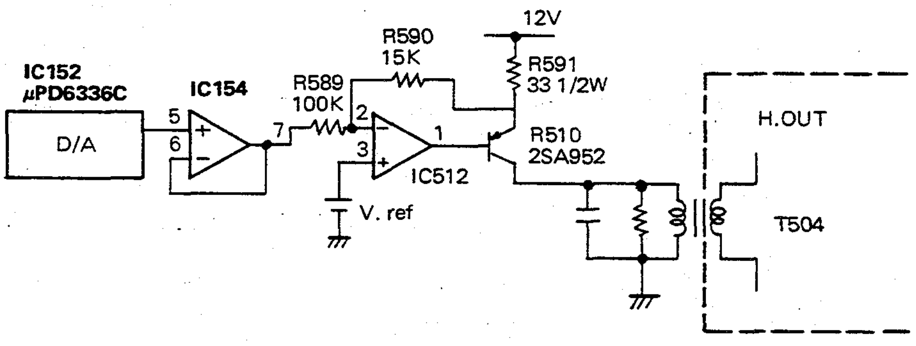

DIGITAL CONTROL
H-F/V
SAW TOOTH OSC. CIRCUIT
Ⓐ
Ⓑ
Ⓒ
Ⓓ
+12V
R517
2.2K
OUTPUT
COMP. #1
COMP. #2
H.SYNC
H.POSI
R511
22K 1%
R512
10K 1%
R515
10K
R514
100
D503
R513
10K

(Fig. 2-5-10) BLOCK DIAGRAM of the H. Phase Circuit


H.SYNC
Ⓐ
Ⓑ
Ⓒ
12Vp-p
SAW TOOTH OSC.
OUTPUT
COMPARATOR #2 OUTPUT
COMPARATOR #1 OUTPUT
Ⓓ
PHASE
SHIFT
H. PHASE OUTPUT
(TRIG. signal for the H. OSC.)

(Fig. 2-5-11) Voltage Waveform

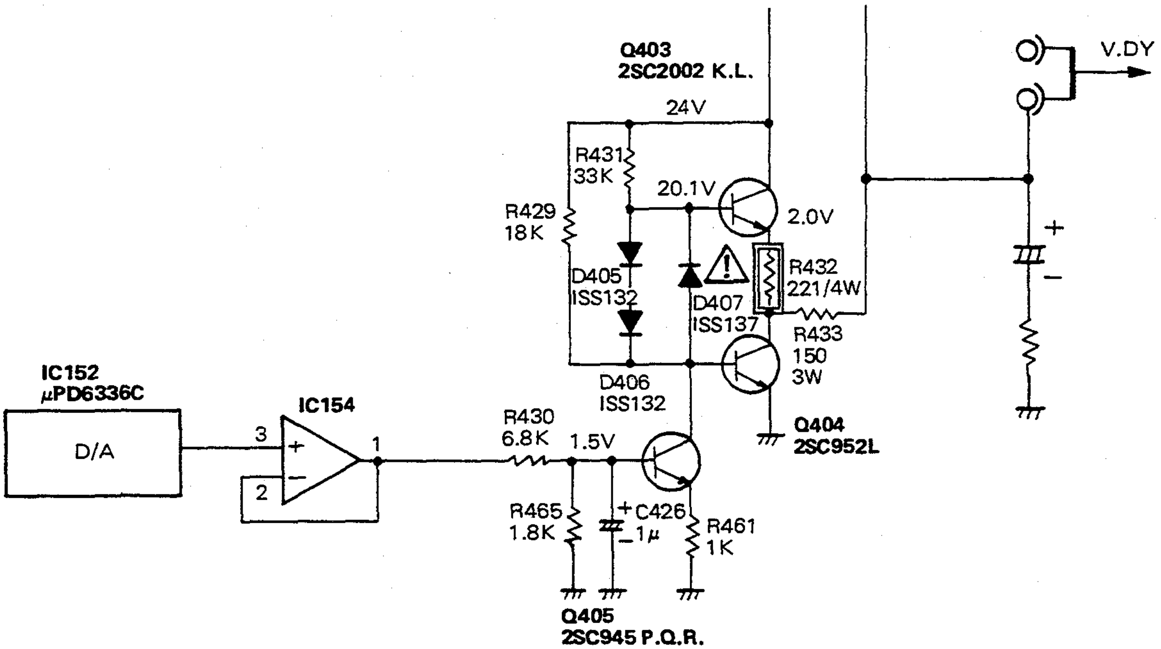
(2-5-5) H. Size Circuit


IC152
μPD6336C
D/A
IC154
5
6
7
R589
100K
R590
15K
12V
R591
33 1/2W
2
3
1
IC512
V. ref
R510
2SA952
H.OUT
T504

(Fig. 2-5-12) BLOCK DIAGRAM of the SIZE CIRCUIT

The H. size control voltage (IC154 pin 7) controls the DC bias level of Q510 and the primary current of T504. The primary current of T504 controls the secondary coil induction value. So, the H. size signal modulates the Horizontal D.Y current, i.e. the H. size of the raster.

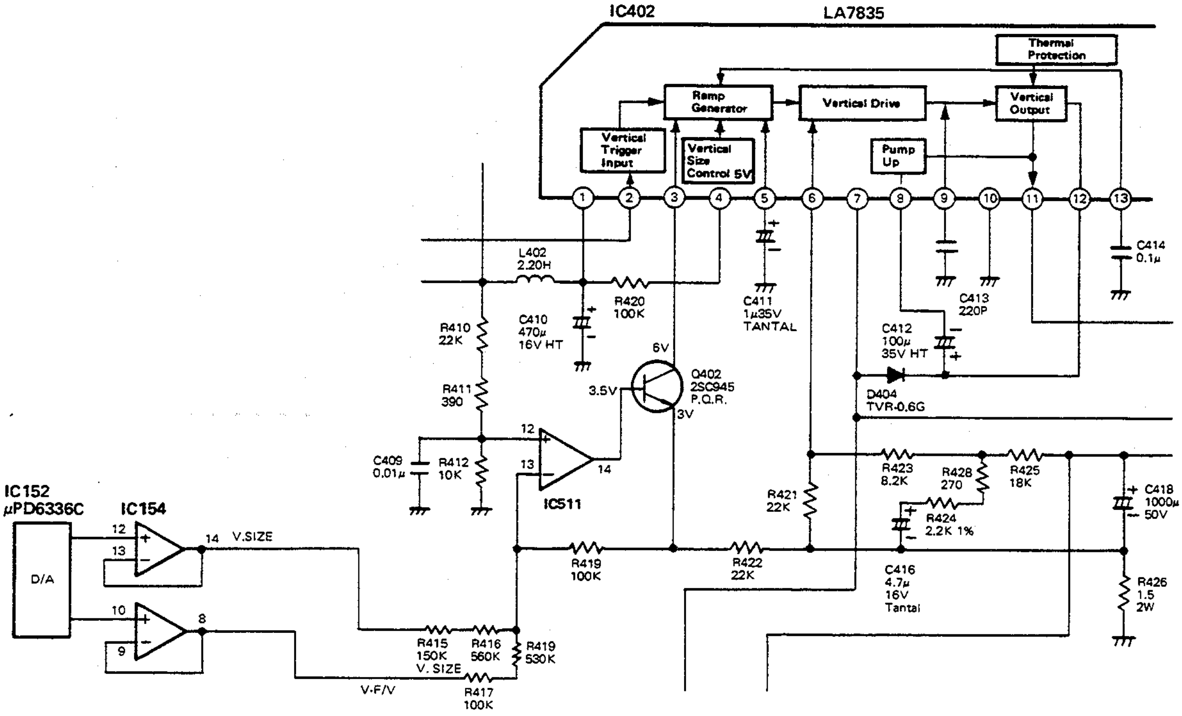
(2-5-6) V. Position Circuit


Q403
2SC2002 K.L.
24V
R431
33K
20.1V
2.0V
R429
18K
D405
ISS132
D407
ISS137
R432
221/4W
R433
150
3W
D406
ISS132
IC152
μPD6336C
D/A
IC154
3
2
1
R430
6.8K
1.5V
Q404
2SC952L
R465
1.8K
C426
1μ
R461
1K
Q405
2SC945 P.Q.R.
V.DY

(Fig. 2-5-13) BLOCK DIAGRAM of V. POSITION CIRCUIT

The V. position control voltage (IC154 pin 1) manipulates the push-pull transistor's (Q403 and Q404) output DC level and also the V. DY DC biasing current.

(2-5-7) V. Size Circuit


IC402
LA7835
Thermal Protection
Ramp Generator
Vertical Drive
Vertical Output
Vertical Trigger Input
Vertical Size Control 5V
Pump Up
1
2
3
4
5
6
7
8
9
10
11
12
13
C414
0.1µ
L402
2.20H
R420
100K
C411
1µ35V
TANTAL
C413
220P
R410
22K
C410
470µ
16V HT
C412
100µ
35V HT
6V
Q402
2SC945
P.Q.R.
3.5V
3V
D404
TVR-0.6G
R411
390
12
13
14
IC511
C409
0.01µ
R412
10K
R423
8.2K
R428
270
R425
18K
R421
22K
R424
2.2K 1%
C418
1000µ
50V
IC152
µPD6336C
IC154
D/A
12
13
14
V.SIZE
10
9
8
R419
100K
R422
22K
C416
4.7µ
16V
Tantal
R426
1.5
2W
R415
150K
V. SIZE
R416
560K
R419
530K
V-F/V
R417
100K

(Fig. 2-5-14) BLOCK DIAGRAM of V. SIZE CIRCUIT

The vertical raster size is controlled by the sink current of IC402 pin 3 (collecter current of Q402). Therefore, it can be controlled by changing the DC base voltage of Q402. The parameters which decide the vertical video size are the vertical frequency and the signal timing.

To keep a constant vertical raster size, the V. F/V (IC154 pin 8) output signal controls the Q402 base voltage. And, to also keep this vertical raster size constant for the pre-set signals, the V. size control voltage (IC154 pin 14) controls the base voltage of Q402.

REPLACEMENT PARTS LIST

Note: The components identified by ⚠ mark are critical for safety.
Replace only with parts Number specified.

The component specified for models JC-1404HME/EE/R

SYMBOL	PARTS NO	DESCRIPTION
*** CRT & TUNER ***		
⚠CRT (JC-1404HME/EE)	33014166	CRT M34KBG23XX193(2)
⚠CRT (JC-1404HMR)	33014167	CRT M34KBG23XX193(2) (R)
*** ICS ***		
IC156	37052179	IC SN74LS07N
IC508	37053122	MOS UPD74HC123AC
IC152	37053266	MOS UPD6336C (D/A CONVERT
IC153	37055216	EEPROM MSM16911RS E-094
IC901	37056245	IC M51387P
⚠IC651	37056273	IC UPC1093J
⚠IC401	37056408	IC HA11423DP-18
IC402	37056415	IC LA7835
IC155 IC157 IC502 IC507 IC512	37056583	IC LM358N
IC101 IC501 IC510	37056584	IC LM339N
IC154 IC509 IC511	37056585	IC LM324N
IC403	37056618	IC BA6110
⚠IC601	37056644	IC M51995P
IC151	37056645	MOS UPD78C11G-223-36
IC801	**37056421**	**MOS PCZ80-40**
IC802	**37051179**	**IC SN74LS123N (MONO MLT)**
IC803	**37051096**	**IC SN74LS367AN (BUFF)**
IC804 IC805	**37052011**	**IC SN74LS136N (EX-OR)**
IC806	**79PC0018**	**MOS UPD74HC04C**
IC807	**37053241**	**MOS UPD74HC86C**
IC808	**37053122**	**MOS UPD74HC123AC**
*** TRANSISTORS ***		
Q151 Q152 Q153 ⚠Q2002 Q401 Q402 Q405 Q502 Q503 Q504 Q506 Q509 ⚠Q514 ⚠Q516 Q517 Q520 Q525 Q526 Q531 Q532 Q533 Q537 Q902 Q903 Q904	350D7217	TR 2SC945-T Q
Q403 Q406 Q530	350E3212	TR,2SC2002-T L
Q534 Q539	350H4417	TR,2SC1473-TA Q
Q910 Q912 Q914	350H5017	TR,2SC3811-TA Q
⚠Q2001 Q407 Q501 Q505 Q507 ⚠Q515 Q518 Q521 Q535 Q536 Q901 Q905 Q906 Q907 Q908 Q960 Q961	350K3517	TR 2SA733/2SA733A-T Q
Q404 Q510	350K4412	TR,2SA952 L,AT

SYMBOL	PARTS NO	DESCRIPTION
*** TRANSISTORS ***		
Q538	350K5217	TR,2SA1018-TA Q
Q563	35025516	TR,2SB744 P
⚠Q604	35047216	TR,2SC945 P
Q562	35065416	TR,2SD882 P
Q806	**35053212**	**TR,2SC2002 L**
Q527	35068112	TR 2SD986 L
⚠Q601	35069713	TR 2SD1581 M
Q523	35082401	TR 2SC3486-YB
Q909 Q911 Q913	35086004	TR,2SC3953-RA D
Q161 Q962	351G0501	TR,AA1A4M-T
Q154	351G0531	TR,AA1L4M-T
Q522	35121900	TR 2SK752
Q511 Q512 Q513	35122100	TR 2SK703
Q524	35122200	TR 2SK854
⚠Q603	35122220	TR 2SK872
Q519	35122500	TR 2SK758
Q508	35122600	TR 2SK701
⚠CR601	35595014	TRIAC AC10DGM
*** DIODES ***		
D101 D102 D103 D104 D105 D106 D107 D108 D109 D110 D111 D112 D113 D114 D115 D116 D117 D118 D119 D120 D121 D122 D123 D124 D125 D126 D151 D152 D155 ⚠D2003 ⚠D2004 ⚠D2005 ⚠D2006 D401 D405 D406 D407 D408 D409 D410 D502 D503 D507 D508 D510 D511 D512 D513 D517 D518 D520 D521 D524 D525 D530 D533 D564 D901 D902	360K1027	DIODE 1SS132
D526 D528 D529 D531 D532 D903	360K1032	DIODE 1SS82-TA
D904 D905 D906 D907 D908	360K1032	DIODE 1SS82-TA
ZD401 ZD520	360K3123	DIODE RD20EB(3)
ZD501	360K3134	DIODE RD15EB(2)-T4
⚠ZD2001 ⚠ZD2002	360K3143	DIODE,RD8.2JSB(1)-T4
⚠ZD502 ZD506 ZD512	360K3160	DIODE RD8.2EB(2)-T4
ZD511	360K3169	DIODE RD6.2EB(2)-T4
⚠ZD503 ⚠ZD504 ZD507	360K3188	DIODE RD3.9EB(2)-T4
⚠D606	36001528	DIODE,1S954
⚠ZD602	36003123	DIODE,RD20EB(3)

SYMBOL	PARTS NO	DESCRIPTION
*** DIODES ***		
⚠ZD657	36003147	DIODE RD18EB(1)
⚠ZD603	36003614	DI RD3.0ESB(1)/ESAB(1)
⚠ZD601	36003684	DIODE RD16ESB (3)
⚠ZD658	36003707	DIODE RD27ESB (4)
D404 D506 D527	361K7160	RECTIFIER,SI. TVR-06G G23
D560 D561		
⚠D2001 ⚠D2002	361K7562	DIODE EGP10G G23
D514 D515 D516	36107160	RECTIFIER,SI. TVR-06G
⚠D603	36107174	RECTIFIER,SI. RU1P
D509	36107293	RECTIFIER,SI. RK14
⚠D651 ⚠D652	36107320	DIODE FMG-G26S
⚠D604 ⚠D605	36107322	DIODE EL1Z
D519	36107518	RECTIFIER,SI. RG2
D522	36107530	DIODE RS4FS
⚠D653	36108072	D,NETWORK D5LCA20
⚠D601	36108090	D,NETWORK D5SBA60
ZD505	367K0017	DIODE RD4.7EB-T4
D550	36801023	DIODE,LIGHT-E SEL1320G
⚠TH601	38112031	THERMISTOR,POSITIVE
⚠PC601 ⚠PC602	38200233	IC TLP634(NHE-LF2)
*** TRANSFORMERS ***		
T502	45803010	TRANS,H.DRIVE
T501	46302102	TRANS FERRITE
T506	46304105	FERRITE TRANS
⚠T601	46310407	TRANS,SWITCHING
⚠T505	47105649	F.B.T.
⚠T503	47502060	TRANS
*** VARIABLE RESISTORS ***		
VR101 VR102	41011211	R,VARIABLE B10K-V
VR904	41071160	R,VARIABLE B3.3K
VR901 VR902 VR903	41071161	R,VARIABLE B4.7K
VR906 VR908 VR910		
VR905 VR907 VR909	41071165	R,VARIABLE B22K
VR505	41085006	R,VARIABLE B2K
VR501 VR502	41085009	R,VARIABLE B10K
VR503	41085010	R,VARIABLE B20K
VR402	41085059	R,VARIABLE B10K
⚠VR651	41505003	R,VARIABLE B500
⚠VR2001 ⚠VR2002 ⚠VR504	41505005	R,VARIABLE B2K
*** RELAYS & SWITCHES ***		
SW110	65161045	SWITCH,SLIDE
SW111	65161046	SWITCH,SLIDE
⚠	65260002	SWITCH,SEE-SAW
SW101 SW102 SW103	65360016	SWITCH,PUSH BUTTON
SW104 SW105 SW106		
SW107 SW108 SW109		
RL801	**65602551**	**RELAY G5A-237P**
RL802	**65699012**	**RELAY RY12W (2T)**

SYMBOL	PARTS NO	DESCRIPTION
*** COILS & FILTERS ***		
LC901	390J9015	FILTER ZJSC-2R2-101TA
⚠T504	60906202	WIDTH CHOKE
⚠L503	60908043	COIL,VARIABLE WIDTH
⚠L504	60918108	COIL,H.LIN
L902 L904 L906	610E1707	COIL,FILTER
L151 L907	610E1714	COIL,FILTER 5.6UH
L901 L903 L905	610E1717	COIL,FILTER 10UHA,T (S)
L152	610E1719	COIL,FILTER 15UH
L508	610F7514	COIL,FILTER 5.6UH
⚠	61062075	POWER LINE FILTER
⚠FL601	61062107	COIL,LINE FILTER
L502	61064006	COIL,FILTER 50UH
L401 L402	61064051	COIL,FILTER 2200UH
⚠L602	61065002	FERRITE BEADS
L507	61067005	COIL,FILTER 1.0UH
L801 L802	**61051709**	**COIL, FILTER L2R2KBS**
L506	61070127	FILTER CHOKC
L505	61070128	COIL,CHOKE
⚠L651	61099011	COIL,CHOKE 33UH
⚠L653	61099014	COIL,CHOKE 33UH
L501	61099019	COIL,CHOKE
L652	61099023	FILTER,CHOKE
⚠L601	61099044	SHIELDING COIL 222K
⚠DEG	61314209	COIL,DEGAUSSING
LC902	61606022	NOIZE FILTER DSS-222M
*** PWB ASSYS ***		
	84K90A01	SW.REG.PWB ASSY
	84K90C01	VIDEO-CRT PWB ASSY
	84K90D01	MAIN PWB ASSY
	79100002	SUB PWB UNIT
*** ELECTRICAL PARTS & MISCELLANEOUS PARTS ***		
HS3	31709103	INSULATOR
HS402	31709202	SHEET,INSULATOR
HS1	31709204	SHEET,HEAT SINK
HS523	31709503	SHEET,INSULATOR
SG901 SG902 SG903	32990047	ARRESTER
SG904		
X151	64099072	CRYSTAL RESONATOR
⚠F601	66699018	FUSE ET T2.5A 250-S.B SOC
SG905	66706001	SPARK GAP 1.2KV
⚠	**70032026**	**SG/CRT SOCKET**
⚠	**70800039**	**LINE CORD (JC-1404HME)**
⚠	**70800323**	**LINE, POWER (JC-1404HMEE)**
⚠	**75513032**	**LINE CORD (JC-1404HMR)**
	70599111	**ADAPTER**
	70599129	**ADAPTER**
	71205037	**HOLDER, FUSE**
	73893056	**CABLE, SIGNAL**

SYMBOL	PARTS NO	DESCRIPTION
*** APPEARANCE PARTS ***		
	24514792	COIL SPRING
	25310471	CABINET FRONT ASSY
	25310491	CABINET BACK ASSY
	25409732	REVOLVING STAND ASSY
	25409732	SPINDLE
	25310672	CABINET BOTTOM ASSY
(JC-1404HME)	25769591	NAME PLATE, INSTRUCTION
(JC-1404HMEE)	25769861	NAME PLATE, INSTRUCTION
(JC-1404HMR)	25769871	NAME PLATE, INSTRUCTION
*** KNOBS & PUSH BUTTONS ***		
	25452771	KNOB,CONTROL
	25452791	KNOB,SLIDE
	25452911	KNOB(A),SLIDE
	25452921	PUSH BUTTON
*** PRINTED & PACKING MATERIALS ***		
(JC-1404HME/R)	24806961	BAG, POLYETHYLENE (270x370)
(JC-1404HME/EE/R)	24813191	BAG, POLYETHYLENE (150x370)
	599910285	S/M JC-1404HME/EE/R/ED
	25605881	FOOT (A), RUBBER
(JC-1404HME/EE/R)	25804551	BAG, POLYETHYLENE (150x230)
(JC-1404HMEE)	25815061	BAG, POLYETHYLENE (270x370)
(JC-1404HME/EE/R)	25804991	BAG, POLYETHYLENE (85x110)
	25816341	FILLER, CARTON (T)
	25816351	FILLER, CARTON (R)
(JC-1404HME)	25817641	CARTON BOX
(JC-1404HMEE)	25817791	CARTON BOX
(JC-1404HMR)	25817801	CARTON BOX
(JC-1404HMR)	78043392	WARRANTY CARD
	78034401	MONITOR SALES OFFICE LIST
	78122562	INSTRUCTION BOOK
*** RESISTORS ***		
⚠R604 ⚠R612	401C6625	R,CARBON 10H 5% 1/4W
⚠R628	401C6657	R,CARBON 220H 5% 1/4W
R5C0 ⚠R602	401C6673	R,CARBON 1.0K 5% 1/4W
⚠R618	401C6697	R,CARBON 10K 5% 1/4W
⚠R660	401C6701	R,CARBON 15K 5% 1/4W
R514 ⚠R663 R968	401K5649	R,CARBON 100H 5% 1/6W
R969 R970		
R151 R5E6 ⚠R659	401K5665	R,CARBON 470H 5% 1/6W
R935 R936 R939		
R940 R943 R944		
R5D8 ⚠R583	401K5667	R,CARBON 560H 5% 1/6W
R1A0 R1A1 R1A2	401K5673	R,CARBON 1.0K 5% 1/6W
R1A3 R1A4 R1A5		
R1A6 R110 R152		
R153 R154 R155		
R156 R157 R158		
R172 R173 R174		
R175 R440 R456		
R461 R472 R5D0		
R5F3 R507 R541		

SYMBOL	PARTS NO	DESCRIPTION
*** RESISTORS ***		
R551 ⚠R582 R907		
R908 R913 R915		
R502 ⚠R655 ⚠R656	401K5677	R,CARBON 1.5K 5% 1/6W
⚠R658 R966		
R403 R408 R448	401K5681	R,CARBON 2.2K 5% 1/6W
R466 R471 R5B3		
R5E5 R5F0 R517		
R518 R524 R528		
R546 R566 ⚠R605		
R914 R971		
⚠R2004 ⚠R2006 R5C3	401K5685	R,CARBON 3.3K 5% 1/6W
R538 R904 R905		
R906 R949 R952		
R955		
⚠R5B1 ⚠R5B2 R5C6	401K5687	R,CARBON 3.9K 5% 1/6W
R918 R925 R930		
R441 R519 R522	401K5689	R,CARBON 4.7K 5% 1/6W
R547 R552 ⚠R665		
R910		
⚠R2003 ⚠R2005 R423	401K5695	R,CARBON 8.2K 5% 1/6W
R554 ⚠R581 R912		
R963		
R1A7 R101 R102	401K5697	R,CARBON 10K 5% 1/6W
R103 R104 R105		
R106 R107 R108		
R109 R112 R113		
R114 R115 R116		
R117 R118 R119		
R120 R121 R122		
R123 R161 R163		
R164 R166 R168		
R170 R183 R184		
R195 R196 R197		
⚠R2007 ⚠R2010 R412		
R435 R442 R443		
R458 R5C1 R5E8		
R5F1 R5F2 R513		
R515 R529 R532		
R533 R542 R545		
R549 R558 R560		
R571 R572 R574		
⚠R584 R586 ⚠R623		
R917 R960 R962		
⚠R2009 R405 ⚠R579	401K5699	R,CARBON 12K 5% 1/6W
⚠R625 ⚠R626 R961		
R590 ⚠R621 R965	401K5701	R, CARBON 15K 5% 1/6W
R198 R401 R410	401K5705	R,CARBON 22K 5% 1/6W
R421 R422 R5A4		
R557 ⚠R580 ⚠R619		
⚠R622 R921 R929	401K5709	R, CARBON 33K 5% 1/6W
R934		
⚠R2008	401K5711	R,CARBON 39K 5% 1/6W
R130 R417 R419	401K5721	R,CARBON 100K 5% 1/6W
R420 R436 R437		
R438 R439 R5A6		
R5A9 R539 R540		
R589 ⚠R615		

*** RESISTORS ***

SYMBOL	PARTS NO	DESCRIPTION
⚠R614	40175125	R,CARBON 10H 5% 1/4W
⚠R616	40175127	R,CARBON 12H 5% 1/4W
⚠R617	40175129	R,CARBON 15H 5% 1/4W
⚠R432	40175133	R,CARBON 22H 5% 1/4W
⚠R525 ⚠R592	40178166	R,CARBON 510H 5% 1/2W
⚠R521	40178177	R,CARBON 1.5K 5% 1/2W
⚠R631 ⚠R632	40216273	R,WIRE 56H 5% 5W
⚠R601	40299107	R,WIRE 15H 10% 5W
R5E0	40371135	R,METAL 27H 5% 1W
R5E1	40371143	R,METAL 56H 5% 1W
⚠R610	40371329	R,METAL 0.22H 5% 1W
R426	40372105	R,METAL 1.5H 5% 2W
⚠R654 ⚠R666	40372133	R,METAL 22H 5% 2W
⚠R651	40372137	R,METAL 33H 5% 2W
R555	40372169	R,METAL 680H 5% 2W
⚠R630	40372213	R,METAL 47K 5% 2W
R567	40373123	R,METAL 8.2H 5% 3W
⚠R606	40373141	R,METAL 47H 5% 3W
⚠R624	40373145	R,METAL 68H 5% 3W
R433	40373153	R,METAL 150H 5% 3W
R5B6	40373167	R,METAL 560H 5% 3W
R5B7	40373169	R,METAL 680H 5% 3W
⚠R667	40373173	R,METAL 1.0K 5% 3W
⚠R657	40373197	R,METAL 10K 5% 3W
⚠R668	40373213	R,METAL 47K 3W 5%
⚠R603	40373217	R,METAL 68K 5% 3W
⚠R607	40373219	R,METAL 82K 5% 3W
R948 R954	40399037	R,METAL 390H 5% 3W
R947 R950 R951	40399038	R,METAL 470H 5% 3W
R953		
R972 R974	40399[illegible]	R,METAL 180H 5% 1W
R973	40399[illegible]	R,METAL 100H 5% 1W
R587 ⚠R662	404C1[illegible]	R,METAL 2.7K 1% 1/6W
R179 R535 ⚠R609	404C169[illegible]	R,METAL 12K 1% 1/6W
⚠R562	404C1711	R,METAL 39K 1% 1/6W
⚠R661	404C1719	R,METAL 82K 1% 1/6W
⚠R2001 ⚠R2002 R5C2	40405109	R,METAL 2.2H 5% 1/4W
⚠R5D1 ⚠R553 R568		
⚠R627		
⚠R536	40405137	R,METAL 33H 5% 1/4W

*** CAPACITORS

SYMBOL	PARTS NO	DESCRIPTION
C559 C570	420C9551	C,CERAMIC 500V 100PF
C577	420C9557	C,CERAMIC 500V 330PF
C547 C591	420C9560	C,CERAMIC 500V 560PF
C560	420C9563	C,CERAMIC 500V 0.001UF
C571	420C9567	C,CERAMIC 500V 2200PF
C404 C414 C420	420J9069	C,CERAMIC 50V 0.1UF
C933	42019175	C,CERAMIC 2KV 0.01UF
C927 C929 C931	4203J571	C,CERAMIC 500V 4700PF
⚠C603 ⚠C604 C610	42053013	C,CERAMIC 400V 1000PF
⚠C662	42099086	C,CERAMIC 2KV 1000PF
⚠C608 ⚠C651 ⚠C655	42099088	C,CERAMIC 2KV 220PF
⚠C621 ⚠C622	42099096	C,CERAMIC 2000V 470PF
C101 C153 C154	421A0425	C,CERAMIC 50V 0.01UF
C155 C156 C157		
C158 C169 C171		
C172 C173 C174		
C175 C176 C177		
C178 C179 C180		
C181 C406 C409		
C425 C430 C543		
C553 C567 C568		
C569 C573 C574		
C575 C579 C580		
C581 C585 C908		
C909 C910 C911		
C935 C936		
C501	421C0208	C,CERAMIC 50V 390PF
C152 C554	421C0213	C,CERAMIC 50V 1000PF
C592	421C0217	C,CERAMIC 50V 0.0022UF
⚠C528	421C0701	C,CERAMIC 50V 100PF
C160 C164 C557	421J9001	C,CERAMIC 50V 0.1UF
C572 C904 C907		
C916 C917 C918		
C919 C920 C922	421J9001	C,CERAMIC 50V 0.1UF
C925 C934		
C162 C163	423A1015	C,CERAMIC 50V 10PF
C151 C403	423A1045	C,CERAMIC 50V 100PF
C583 C921 C923	423A1047	C,CERAMIC 50V 120PF
C926		
C413	423A1053	C,CERAMIC 50V 220PF
C502 C513	427A7005	C,FILM 100V 0.0022UF
C506 C507 ⚠C529	427F4001	C,FILM 50V 1000PF
C584		
C530	427F4010	C,FILM 50V 5600PF
C524 C538	427F4013	C,FILM 50V 0.01UF
C417	427F4017	C,FILM 50V 0.022UF
C431	427F4021	C,FILM 50V 0.047UF
C539 C541	427F4025	C,FILM 50V 0.1UF
C523	427F4051	C,FILM 50V 1000PF
C514	427F4058	C,FILM 50V 3900PF
C508	427F4059	C,FILM 50V 4700PF
C402	427F4061	C,FILM 50V 6800PF
⚠C624	427F4063	C,FILM 50V 0.01UF
C510	427F4065	C,FILM 50V 0.015UF
C509 C516	427F4071	C,FILM 50V 0.047UF

*** CAPACITORS ***

SYMBOL	PARTS NO	DESCRIPTION
C562	42754163	C,FILM 100V 0.01UF
C555	42754207	C,FILM 200V 0.01UF
C544	42754267	C,FILM 200V 0.022UF
C548	42754470	C,FILM 400V 0.039UF
⚠C660	4282C010	C,METAL 50V 0.056UF
⚠C616	4282C011	C,FILM 50V 0.068UF
⚠C605 ⚠C614 ⚠C618	4282C013	C,ELEC 50V 0.1UF
C401	4282C025	C,METAL FILM 50V 1UF
⚠C602	42824329	C,FILM 250V 0.22UF
⚠C661	42840009	C,METAL FILM 100V 0.047UF
⚠C658 ⚠C659	42840084	C,METAL 250V 0.018UF
⚠C609	42840169	C,METAL 400V 470000PF
⚠C617	42842004	C,METAL 50V 390PF
C549	42842506	C,METAL 1600V 7800PF
C552	42842507	C,METAL 400V 0.025UF
⚠C533	42843501	C,FILM 200V 0.82UF
⚠C534	42843508	C,METAL 160V 0.47UF
⚠C532	42843509	C,METAL 400V 0.12UF
⚠C535	42899014	C,METAL FILM 400V 0.39UF
⚠C601	42899097	C,METAL 250V 0.47UF
C545	430B3051	C,ELEC 16V 220UF
C522	430B3071	C,ELEC 25V 220UF
⚠C2002	430B3091	C ELEC 35V 220UF
C928 C930 C932	430B3182	C,ELEC 160V 1UF
C565	430B3187	C,ELEC 160V 22UF
C912	430B5051	C,ELEC 16V 220UF
C410	430B5053	C,ELEC 16V 470UF
C419	430B5107	C,ELEC 50V 22UF
⚠C2003 ⚠C2004	430B6015	C,ELEC 10V 47UF
C505	430B6016	C,ELEC 10V 100UF
C512	430B6017	C,ELEC 10V 220UF
C161 ⚠C526	430B6039	C,ELEC 25V 22UF
C517	430B6041	C,ELEC 25V 47UF
C561	430B6053	C,ELEC 35V 47UF
C595	430B6055	C,ELEC 35V 220UF
C426 C520 ⚠C527	430B6061	C,ELEC 50V 1UF
C542 C546	430B6062	C,ELEC 50V 2.2UF
C518	430B6065	C,ELEC 50V 10UF
C540	430B6066	C,ELEC 50V 22UF
C556 C558	430B6068	C,ELEC 50V 47UF
C593	430B9061	C,ELEC 50V 1UF
C913 C914 C915	430B9062	C,ELEC 50V 2.2UF
C536	430B9556	C,ELEC 250V 10UF
⚠C664	4302J053	C,ELEC 35V 47UF
⚠C663	4302J058	C,ELEC 35V 1000UF
⚠C615	4302J064	C,ELEC 50V 4.7UF
⚠C611 ⚠C619	4302J065	C,ELEC 50V 10UF
⚠C612	4302J066	C,ELEC 50V 22UF
⚠C657	4302J102	C,ELEC 100V 100UF
⚠C656	4302J103	C,ELEC 100V 220UF
C594	4302J516	C,ELEC 160V 10UF
⚠C654	4302J559	C,ELEC 250V 47UF
⚠C653	4302J560	C,ELEC 250V 100UF
C418	43026073	C,ELEC 50V 1000UF
C537	43041013	C,ELEC 160V 100UF
⚠C606	43109577	C,ELEC 400V 390UF
C905	4339J031	C,ELEC 35V 4.7UF
C416	435A8153	C,TANTLM 16V 4.7UF
C411 C515	435A8307	C,TANTALM 35V 1UF

REPLACEMENT PARTS LIST

Note: The components identified by ⚠ mark are critical for safety.
Replace only with parts Number specified.

The components specified for Model JC-1404HMED.

SYMBOL	PARTS NO	DESCRIPTION
*** CRT & TUNER ***		
⚠	33014168	CRT M34KBG23XX204
*** ICS ***		
IC156	37052179	IC SN74LS07N
IC508	37053122	MOS UPD74HC123AC
IC152	37053266	MOS UPD6336C (D/A CONVERT
IC153	37055216	EEPROM MSM16911RS E-094
IC901	37056245	IC M51387P
⚠IC651	37056273	IC UPC1093J
⚠IC401	37056408	IC HA11423DP-18
IC402	37056415	IC LA7835
IC155 IC157 IC502	37056583	IC LM358N
IC507 IC512		
IC101 IC501 IC510	37056584	IC LM339N
IC154 IC509 IC511	37056585	IC LM324N
IC403	37056618	IC BA6110
⚠IC601	37056644	IC M51995P
IC151	37056645	MOS UPD78C11G-223-36
IC801	37056421	MOS PCZ80-40
IC802	37051179	IC SN74LS123N (MONO MLT)
IC803	37051096	IC SN74LS367AN (BUFF)
IC804 IC805	37052011	IC SN74LS136N (EX-OR)
IC806	79PC0018	MOS UPD74HC04C
IC807	37053241	MOS UPD74HC86C
IC808	37053122	MOS UPD74HC123AC
*** TRANSISTORS ***		
Q151 Q152 Q153	350D7217	TR 2SC945-T Q
⚠Q2002 Q401 Q402		
Q405 Q502 Q503		
Q504 Q506 Q509		
⚠Q514 ⚠Q516 Q517		
Q520 Q525 Q526		
Q531 Q532 Q533		
Q537 Q902 Q903		
Q904		
Q403 Q406 Q530	350E3212	TR,2SC2002-T L
Q534 Q539	350H4417	TR,2SC1473-TA Q
Q910 Q912 Q914	350H5017	TR,2SC3811-TA Q
⚠Q2001 Q407 Q501	350K3517	TR 2SA733/2SA733A-T Q
Q505 Q507 ⚠Q515		
Q518 Q521 Q535		
Q536 Q901 Q905		
Q906 Q907 Q908		
Q960 Q961		
Q404 Q510	350K4412	TR,2SA952 L,AT
Q538	350K5217	TR,2SA1018-TA Q
Q563	35025516	TR,2SB744 P
⚠Q604	35047216	TR,2SC945 P
Q562	35065416	TR,2SD882 P
Q806	35053212	TR, 2SC2002L

SYMBOL	PARTS NO	DESCRIPTION
*** TRANSISTORS ***		
Q527	35068112	TR 2SD986 L
⚠Q601	35069713	TR 2SD1581 M
⚠Q523	35082401	TR 2SC3486-YB
Q909 Q911 Q913	35086004	TR,2SC3953-RA D
Q161 Q962	351G0501	TR,AA1A4M-T
Q154	351G0531	TR,AA1L4M-T
Q522	35121900	TR 2SK752
Q511 Q512 Q513	35122100	TR 2SK703
Q524	35122200	TR 2SK854
⚠Q603	35122220	TR 2SK872
Q519	35122500	TR 2SK758
Q508	35122600	TR 2SK701
⚠CR601	35595014	TRIAC AC10DGM
*** DIODES ***		
D101 D102 D103	360K1027	DIODE 1SS132
D104 D105 D106		
D107 D108 D109		
D110 D111 D112		
D113 D114 D115		
D116 D117 D118		
D119 D120 D121		
D122 D123 D124		
D125 D126 D151		
D152 D155 ⚠D2003		
⚠D2004 ⚠D2005 ⚠D2006		
D401 D405 D406		
D407 D408 D409		
D410 D502 D503		
D507 D508 D510		
D511 D512 D513		
D517 D518 D520		
D521 D524 D525		
D530 D533 D564		
D901 D902 D909		
D526 D528 D529	360K1032	DIODE 1SS82-TA
D531 D532 D903		
D904 D905 D906	360K1032	DIODE 1SS82-TA
D907 D908 D910		
D911		
ZD401 ZD520	360K3123	DIODE RD20EB(3)
ZD501	360K3134	DIODE RD15EB(2)-T4
⚠ZD2001 ⚠ZD2002	360K3143	DIODE,RD8.2JSB(1)-T4
⚠ZD502 ZD506 ZD512	360K3160	DIODE RD8.2EB(2)-T4
ZD511	360K3169	DIODE RD6.2EB(2)-T4
⚠ZD503 ⚠ZD504 ZD507	360K3188	DIODE RD3.9EB(2)-T4
⚠D606	36001528	DIODE,1S954
⚠ZD602	36003123	DIODE,RD20EB(3)
⚠ZD657	36003147	DIODE RD18EB(1)
⚠ZD603	36003614	DI RD3.0ESB(1)/ESAB(1)
⚠ZD601	36003684	DIODE RD16ESB (3)
⚠ZD658	36003707	DIODE RD27ESB (4)

SYMBOL	PARTS NO	DESCRIPTION
*** DIODES ***		
D404 D506 D527	361K7160	RECTIFIER,SI. TVR-06G G23
D560 D561		
⚠D2001 ⚠D2002	361K7562	DIODE EGP10G G23
D514 D515 D516	36107160	RECTIFIER,SI. TVR-06G
⚠D603	36107174	RECTIFIER,SI. RU1P
D509	36107293	RECTIFIER,SI. RK14
⚠D651 ⚠D652	36107320	DIODE FMG-G26S
⚠D604 ⚠D605	36107322	DIODE EL1Z
D519	36107518	RECTIFIER,SI. RG2
⚠D522	36107530	DIODE RS4FS
⚠D601	36107585	DIODE RBV-406H
⚠D653	36108072	D,NETWORK D5LCA20
ZD505	367K0017	DIODE RD4.7EB-T4
D550	36801023	DIODE,LIGHT-E SEL1320G
⚠TH601	38112031	THERMISTOR,POSITIVE
⚠PC601 ⚠PC602	38200233	IC TLP634(NHE-LF2)
*** TRANSFORMERS ***		
T502	45803010	TRANS,H.DRIVE
T501	46302102	TRANS FERRITE
T506	46304105	FERRITE TRANS
⚠T601	46310407	TRANS,SWITCHING
⚠T505	47105651	F.B.T.(Q)
⚠T503	47502060	TRANS
*** VARIABLE RESISTORS ***		
VR101 VR102	41011211	R,VARIABLE B10K-V
VR904	41071160	R,VARIABLE B3.3K
VR901 VR902 VR903	41071161	R,VARIABLE B4.7K
VR906 VR908 VR910		
VR905 VR907 VR909	41071165	R,VARIABLE B22K
VR505	41085006	R,VARIABLE B2K
VR501 VR502	41085009	R,VARIABLE B10K
VR503	41085010	R,VARIABLE B20K
VR402	41085059	R,VARIABLE B10K
⚠VR651	41505003	R,VARIABLE B500
⚠VR2001 ⚠VR2002 ⚠VR504	41505005	R,VARIABLE B2K
*** RELAYS & SWITCHES ***		
SW110	65161045	SWITCH,SLIDE
SW111	65161046	SWITCH,SLIDE
⚠	65260002	SWITCH,SEE-SAW
SW101 SW102 SW103	65360016	SWITCH,PUSH BUTTON
SW104 SW105 SW106		
SW107 SW108 SW109		
RL801	65602551	RELAY G5A-23TP
RL802	65699012	RELAY RY12W (2T)

SYMBOL	PARTS NO	DESCRIPTION
*** COILS & FILTERS ***		
LC901	390J9015	FILTER ZJSC-2R2-101TA
⚠T504	60906202	WIDTH CHOKE
⚠L503	60908062	COIL,VARIABLE
⚠L504	60918108	COIL,H.LIN
L902 L904 L906	610E1708	COIL,FILTER,L1R8K,BT(S)
L901 L903 L905	610E1712	COIL,FILTER 3.9UH
L151 L907	610E1714	COIL,FILTER 5.6UH
L152	610E1719	COIL,FILTER 15UH
L508	610F7514	COIL,FILTER 5.6UH
⚠	61062076	POWER LINE FILTER
⚠FL601	61062107	COIL,LINE FILTER
L502	61064006	COIL,FILTER 50UH
L401 L402	61064051	COIL,FILTER 2200UH
⚠L602	61065002	FERRITE BEADS
L507	61067005	COIL,FILTER 1.0UH
L506	61070127	FILTER CHOKC
L505	61070128	COIL,CHOKE
⚠L651	61099011	COIL,CHOKE 33UH
L801 L802	61051709	COIL, FILTER L2R2KBS
⚠L653	61099014	COIL,CHOKE 33UH
L501	61099019	COIL,CHOKE
⚠L652	61099023	FILTER,CHOKE
⚠L601	61099044	SHIELDING COIL 222K
⚠DEG	61314212	COIL,DEGAUSSING
LC902	61606022	NOIZE FILTER DSS-222M
*** PWB ASSYS ***		
	84L07A01	SW.REG.PWB ASSY
	84L07C01	VIDEO-CRT PWB ASSY
	84L07D01	MAIN PWB ASSY
*** ELECTRICAL PARTS & MISCELLANEOUS PARTS ***		
HS3	31709103	INSULATOR
HS402	31709202	SHEET,INSULATOR
HS1	31709204	SHEET,HEAT SINK
HS523	31709503	SHEET,INSULATOR
SG901 SG902 SG903	32990047	ARRESTER
SG904		
X151	64099072	CRYSTAL RESONATOR
⚠F601	66699018	FUSE ET T2.5A 250-S.B SOC
SG905	66706001	SPARK GAP 1.2KV
⚠	70032026	SG/CRT SOCKET
	70800039	LINE CORD
	73893067	CABLE SIGNAL
	70599111	ADAPTER
	70599129	ADAPTER
	71205037	HOLDER,FUSE
CN-RH CN-RH1 CN-RH2	73721003	CONNECTOR PIN 2P
CN-RH3		
CN-L	73729006	POST 2P

SYMBOL	PARTS NO	DESCRIPTION
*** APPEARANCE PARTS ***		
	24514792	COIL SPRING
	25310471	CABINET FRONT ASSY
	25310492	CABINET BACK ASSY
	25310672	CABINET BOTTOM ASSY
	25409732	REVOLVING STAND ASSY
	25409751	SPINDLE
	25770091	NAME PLATE. INSTRUCTION
*** KNOBS & PUSH BUTTONS ***		
	25452771	KNOB, CONTROL
	25452791	KNOB, SLIDE
	25452911	KNOB(A), SLIDE
	25452921	PUSH BUTTON
*** PRINTED & PACKING MATERIALS ***		
	24806961	BAG, POLYETHYLENE(270*370)
	24813191	BAG, POLYETHYLENE(150*370)
	599910285	S/M JC-1404HME/EE/R/ED
	25605881	FOOT(A), RUBBER
	25804551	BAG, POLYETHYLENE(150*230)
	78034401	MONITOR SALES OFFICE LIST
	25804991	BAG, POLYETHYLENE (85*110)
	25816341	FILLER, CARTON(T)
	25816351	FILLER, CARTON(R)
	25818361	CARTON BOX(JC-1404HMED)
	78122531	INSTRUCTION BOOK
*** RESISTORS ***		
⚠R604 ⚠R612	401C6625	R, CARBON 10H 5% 1/4W
⚠R628	401C6657	R, CARBON 220H 5% 1/4W
R5C0 ⚠R602	401C6673	R, CARBON 1.0K 5% 1/4W
⚠R618	401C6697	R, CARBON 10K 5% 1/4W
⚠R660	401C6701	R, CARBON 15K 5% 1/4W
R514 ⚠R663 R968	401K5649	R, CARBON 100H 5% 1/6W
R969 R970		
R151 R5E6 ⚠R659	401K5665	R, CARBON 470H 5% 1/6W
R936 R940 R944		
R5D8 ⚠R583	401K5667	R, CARBON 560H 5% 1/6W
R1A0 R1A1 R1A2	401K5673	R, CARBON 1.0K 5% 1/6W
R1A3 R1A4 R1A5		
R1A6 R110 R152		
R153 R154 R155		
R156 R157 R158		
R172 R173 R174		
R175 R440 R456		
R461 R472 R5D0		
R5F3 R507 R541		
R551 ⚠R582 R907		
R908 R913 R915		
R966	401K5675	R, CARBON 1.2K 5% 1/6W
R502 ⚠R655 ⚠R656	401K5677	R, CARBON 1.5K 5% 1/6W
⚠R658		
R403 R408 R448	401K5681	R, CARBON 2.2K 5% 1/6W
R466 R471 R5B3		

SYMBOL	PARTS NO	DESCRIPTION
*** RESISTORS ***		
R5E5 R5F0 R517		
R518 R524 R528		
R546 R566 ⚠R605		
R914 R955 R971		
R975		
⚠R2004 ⚠R2006 R5C3	401K5685	R, CARBON 3.3K 5% 1/6W
R538 R904 R905		
R906		
⚠R5B1 ⚠R5B2 R5C6	401K5687	R, CARBON 3.9K 5% 1/6W
R918 R925 R930		
R159 R167 R169	401K5689	R, CARBON 4.7K 5% 1/6W
R171 R402 R441		
R519 R522 R547		
R552 ⚠R665 R910		
⚠R2003 ⚠R2005 R554	401K5695	R, CARBON 8.2K 5% 1/6W
⚠R581 R912 R963		
R1A7 R101 R102	401K5697	R, CARBON 10K 5% 1/6W
R103 R104 R105		
R106 R107 R108		
R109 R112 R113		
R114 R115 R116		
R117 R118 R119		
R120 R121 R122		
R123 R161 R163		
R164 R166 R168		
R170 R183 R184		
R195 R196 R197		
⚠R2007 ⚠R2010 R409		
R412 R435 R442		
R443 R458 R5C1		
R5E8 R5F1 R5F2		
R513 R515 R529		
R532 R533 R542		
R545 R549 R558		
R560 R571 R572		
R574 ⚠R584 R586		
⚠R623 R917 R960		
R962		
⚠R2009 R405 ⚠R579	401K5699	R, CARBON 12K 5% 1/6W
⚠R625 ⚠R626 R961		
R569 R576 R577	401K5701	R, CARBON 15K 5% 1/6W
R590 ⚠R621 R965		
R198 R401 R410	401K5705	R, CARBON 22K 5% 1/6W
R5A4 R557 ⚠R580		
⚠R619		
R404 R414 R445	401K5707	R, CARBON 27K 5% 1/6W
⚠R622 R921 R929		
R934		
⚠R2008	401K5711	R, CARBON 39K 5% 1/6W
R130 R417 R419	401K5721	R, CARBON 100K 5% 1/6W
R420 R436 R437		
R438 R439 R5A6		
R5A9 R539 R540		
R589 ⚠R615		
⚠R2011	401K5731	R, CARBON 270K 5% 1/6W
⚠R616	40175127	R, CARBON 12H 5% 1/4W
⚠R617	40175129	R, CARBON 15H 5% 1/4W
⚠R432	40175133	R, CARBON 22H 5% 1/4W

*** RESISTORS ***

SYMBOL	PARTS NO	DESCRIPTION
⚠R525 ⚠R592	40178166	R,CARBON 510H 5% 1/2W
⚠R521	40178177	R,CARBON 1.5K 5% 1/2W
⚠R631	40216274	R,WIRE 1.2H 5% 5W
⚠R601	40299107	R,WIRE 15H 10% 5W
R5E0	40371135	R,METAL 27H 5% 1W
R5E1	40371143	R,METAL 56H 5% 1W
⚠R610	40371329	R,METAL 0.22H 5% 1W
R426	40372105	R,METAL 1.5H 5% 2W
⚠R654 ⚠R666	40372133	R,METAL 22H 5% 2W
⚠R651	40372137	R,METAL 33H 5% 2W
R555	40372169	R,METAL 680H 5% 2W
⚠R630	40372213	R,METAL 47K 5% 2W
R567	40373123	R,METAL 8.2H 5% 3W
⚠R606	40373141	R,METAL 47H 5% 3W
R624	40373145	R,METAL 68H 5% 3W
R433	40373153	R,METAL 150H 5% 3W
R5B6	40373167	R,METAL 560H 5% 3W
R5B7	40373169	R,METAL 680H 5% 3W
⚠R667	40373173	R,METAL 1.0K 5% 3W
⚠R657	40373197	R,METAL 10K 5% 3W
⚠R668	40373213	R,METAL 47K 3W 5%
⚠R603	40373217	R,METAL 68K 5% 3W
⚠R607	40373219	R,METAL 82K 5% 3W
R948 R954	40399037	R,METAL 390H 5% 3W
R947 R950 R951	40399038	R,METAL 470H 5% 3W
R953		
R947 R972 R974	40399039	R,METAL 180H 5% 1W
R973	40399040	R,METAL 100H 5% 1W
R587 ⚠R662	404C1683	R,METAL 2.7K 1% 1/6W
R179 ⚠R535 ⚠R609	404C1699	R,METAL 12K 1% 1/6W
⚠R562	404C1711	R,METAL 39K 1% 1/6W
⚠R661	404C1719	R,METAL 82K 1% 1/6W
⚠R2001 ⚠R2002 ⚠R5C2	40405109	R,METAL 2.2H 5% 1/4W
⚠R5D1 ⚠R553 ⚠R568		
⚠R627		
⚠R536	40405137	R,METAL 33H 5% 1/4W
⚠R520	40405149	R,METAL 100H 5% 1/4W

*** CAPACITORS ***

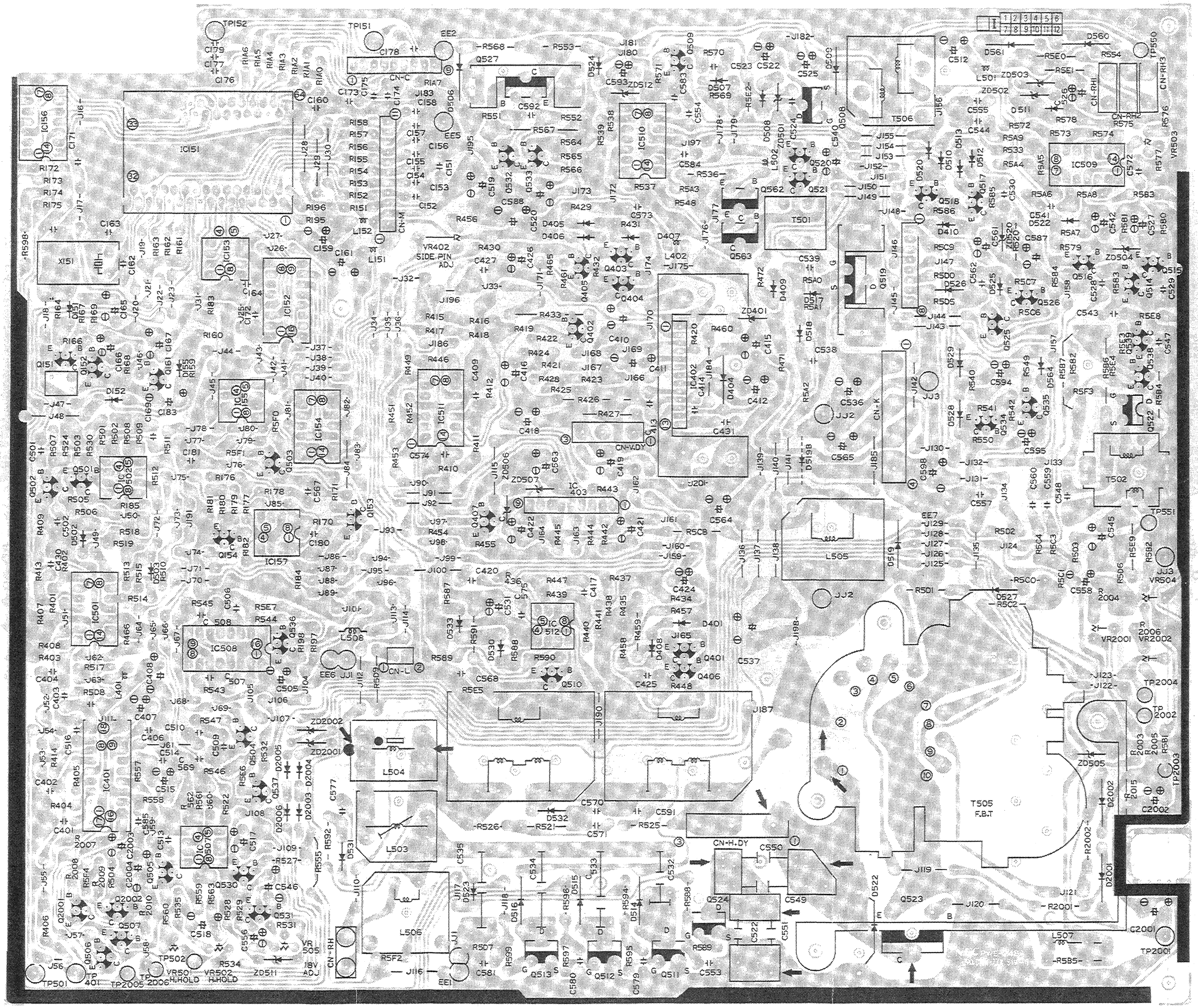
SYMBOL	PARTS NO	DESCRIPTION
C559 C570	420C9551	C,CERAMIC 500V 100PF
C577	420C9557	C,CERAMIC 500V 330PF
C547 C591	420C9560	C,CERAMIC 500V 560PF
C560	420C9563	C,CERAMIC 500V 0.001UF
C571	420C9567	C,CERAMIC 500V 2200PF
C404 C414 C420	420J9069	C,CERAMIC 50V 0.1UF
C927 C929 C931	4203J571	C,CERAMIC 500V 4700PF
C933	42040108	C,CERAMIC 2KV 0.01UF
⚠C603 ⚠C604 ⚠C610	42053013	C,CERAMIC 400V 1000PF
⚠C662	42099086	C,CERAMIC 2KV 1000PF
⚠C608 ⚠C651 ⚠C655	42099088	C,CERAMIC 2KV 220PF
⚠C621 ⚠C622	42099096	C,CERAMIC 2000V 470PF
C153 C154 C155	421A0425	C,CERAMIC 50V 0.01UF
C156 C157 C158		

*** CAPACITORS ***

SYMBOL	PARTS NO	DESCRIPTION
C169 C171 C173		
C174 C175 C176		
C177 C178 C179		
C180 C181 C406		
C409 C425 C430		
C543 C553 C567		
C568 C569 C573		
C574 C575 C579		
C580 C581 C585		
C908 C909 C910		
C911 C935 C936		
C501	421C0208	C,CERAMIC 50V 390PF
C152 C554	421C0213	C,CERAMIC 50V 1000PF
C592	421C0217	C,CERAMIC 50V 0.0022UF
⚠C528	421C0701	C,CERAMIC 50V 100PF
C101 C160 C164	421J9001	C,CERAMIC 50V 0.1UF
C172 C557 C572		
C904 C907 C916		
C917 C918 C919	421J9001	C,CERAMIC 50V 0.1UF
C920 C922 C925		
C934		
C162 C163	423A1015	C,CERAMIC 50V 10PF
C151 C403	423A1045	C,CERAMIC 50V 100PF
C583	423A1047	C,CERAMIC 50V 120PF
C921 C923 C926	423A1051	C,CERAMIC 50V 180PF
C413	423A1053	C,CERAMIC 50V 220PF
C502 C513	427A7005	C,FILM 100V 0.0022UF
⚠C529 C584	427F4001	C,FILM 50V 1000PF
C530	427F4010	C,FILM 50V 5600PF
C524 C538	427F4013	C,FILM 50V 0.01UF
C417	427F4017	C,FILM 50V 0.022UF
C431	427F4021	C,FILM 50V 0.047UF
C539 C541	427F4025	C,FILM 50V 0.1UF
C523	427F4051	C,FILM 50V 1000PF
C514	427F4058	C,FILM 50V 3900PF
C508	427F4059	C,FILM 50V 4700PF
C402	427F4061	C,FILM 50V 6800PF
⚠C624	427F4063	C,FILM 50V 0.01UF
C510	427F4065	C,FILM 50V 0.015UF
C509 C516	427F4071	C,FILM 50V 0.047UF
C562	42754163	C,FILM 100V 0.01UF
C555	42754207	C,FILM 200V 0.01UF
C544	42754267	C,FILM 200V 0.022UF
C548	42754470	C,FILM 400V 0.039UF
C506 C507	4276H325	CQ93P1H102JW
⚠C660	4282C010	C,METAL 50V 0.056UF
⚠C616	4282C011	C,FILM 50V 0.068UF
⚠C605 ⚠C614 ⚠C618	4282C013	C,ELEC 50V 0.1UF
C401	4282C025	C,METAL FILM 50V 1UF
⚠C620	42824325	C,FILM 250V 0.1UF
⚠C602	42824329	C,FILM 250V 0.22UF
⚠C661	42840009	C,METAL FILM 100V 0.047UF
⚠C658 ⚠C659	42840084	C,METAL 250V 0.018UF
⚠C609	42840169	C,METAL 400V 470000PF

*** CAPACITORS ***

SYMBOL	PARTS NO	DESCRIPTION
⚠C617	42842004	C,METAL 50V 390PF
⚠C549	42842506	C,METAL 1600V 7800PF
⚠C552	42842507	C,METAL 400V 0.025UF
⚠C533	42843501	C,FILM 200V 0.82UF
⚠C534	42843508	C,METAL 160V 0.47UF
⚠C532	42843509	C,METAL 400V 0.12UF
⚠C535	42899014	C,METAL FILM 400V 0.39UF
⚠C601	42899097	C,METAL 250V 0.47UF
C545	430B3051	C,ELEC 16V 220UF
⚠C2002	430B3091	C ELEC 35V 220UF
C928 C930 C932	430B3182	C,ELEC 160V 1UF
C565	430B3187	C,ELEC 160V 22UF
C419	430B5107	C,ELEC 50V 22UF
⚠C2003 ⚠C2004	430B6015	C,ELEC 10V 47UF
C161 ⚠C526	430B6039	C,ELEC 25V 22UF
C426 ⚠C520 ⚠C527 C598	430B6061	C,ELEC 50V 1UF
C542 C546	430B6062	C,ELEC 50V 2.2UF
C518	430B6065	C,ELEC 50V 10UF
C540	430B6066	C,ELEC 50V 22UF
C556 C558	430B6068	C,ELEC 50V 47UF
⚠C2001 C564	430B9053	C,ELEC 35V 47UF
C593	430B9061	C,ELEC 50V 1UF
C913 C914 C915	430B9062	C,ELEC 50V 2.2UF
C536	430B9556	C,ELEC 250V 10UF
C537	4302C190	C,ELEC 160V 100UF
⚠C664	4302J053	C,ELEC 35V 47UF
⚠C663	4302J058	C,ELEC 35V 1000UF
⚠C615	4302J064	C,ELEC 50V 4.7UF
⚠C611 ⚠C619	4302J065	C,ELEC 50V 10UF
⚠C612	4302J066	C,ELEC 50V 22UF
⚠C657	4302J102	C,ELEC 100V 100UF
⚠C656	4302J103	C,ELEC 100V 220UF
C594	4302J516	C,ELEC 160V 10UF
⚠C654	4302J559	C,ELEC 250V 47UF
⚠C653	4302J560	C,ELEC 250V 100UF
C418	43026073	C,ELEC 50V 1000UF
⚠C606	43109577	C,ELEC 400V 390UF
C905	4339J031	C,ELEC 35V 4.7UF
C416	435A8153	C,TANTLM 16V 4.7UF
C411 C515	435A8307	C,TANTALM 35V 1UF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IC512
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T505
F.B.T
T506
L503
L504
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L506
CN-C
CN-M
CN-K
CN-L
CN-RH
CN-H.DY
CN-V.DY
X151
VR402
SIDE PIN ADJ
VR501
H.HOLD
VR502
H.HOLD
VR503
VR504
VR505
18V ADJ
TP151
TP152
TP501
TP502
TP551
TP2001
TP2002
TP2003
TP2004
TP2005
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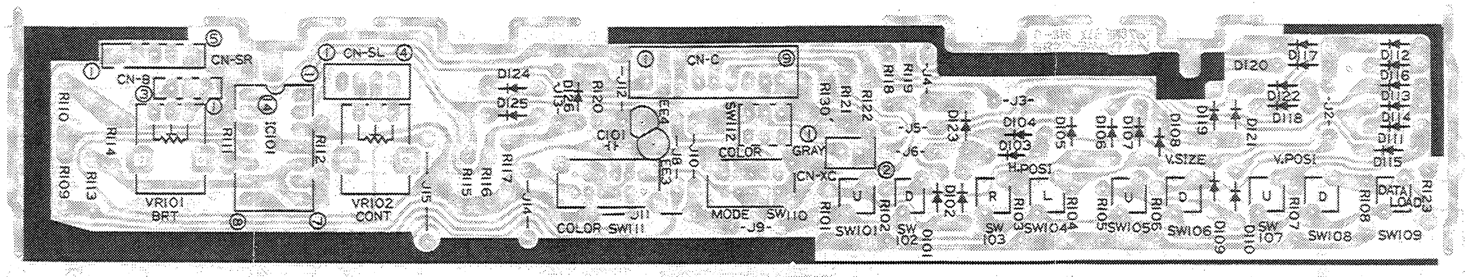
EE2
EE5
EE6
EE7
JJ1
JJ2
JJ3

MAIN PWB ASSY (PWE-248A)

– Solder side –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MODE SW110
H.POSI
V.SIZE
V.POSI
DATA LOAD
SW101
SW102
SW103
SW104
SW105
SW106
SW107
SW108
SW109
SW112
D120
D123
R109
R110
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R130
R101
R102
R103
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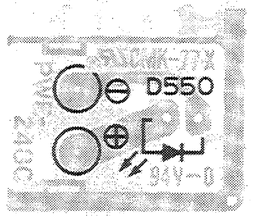
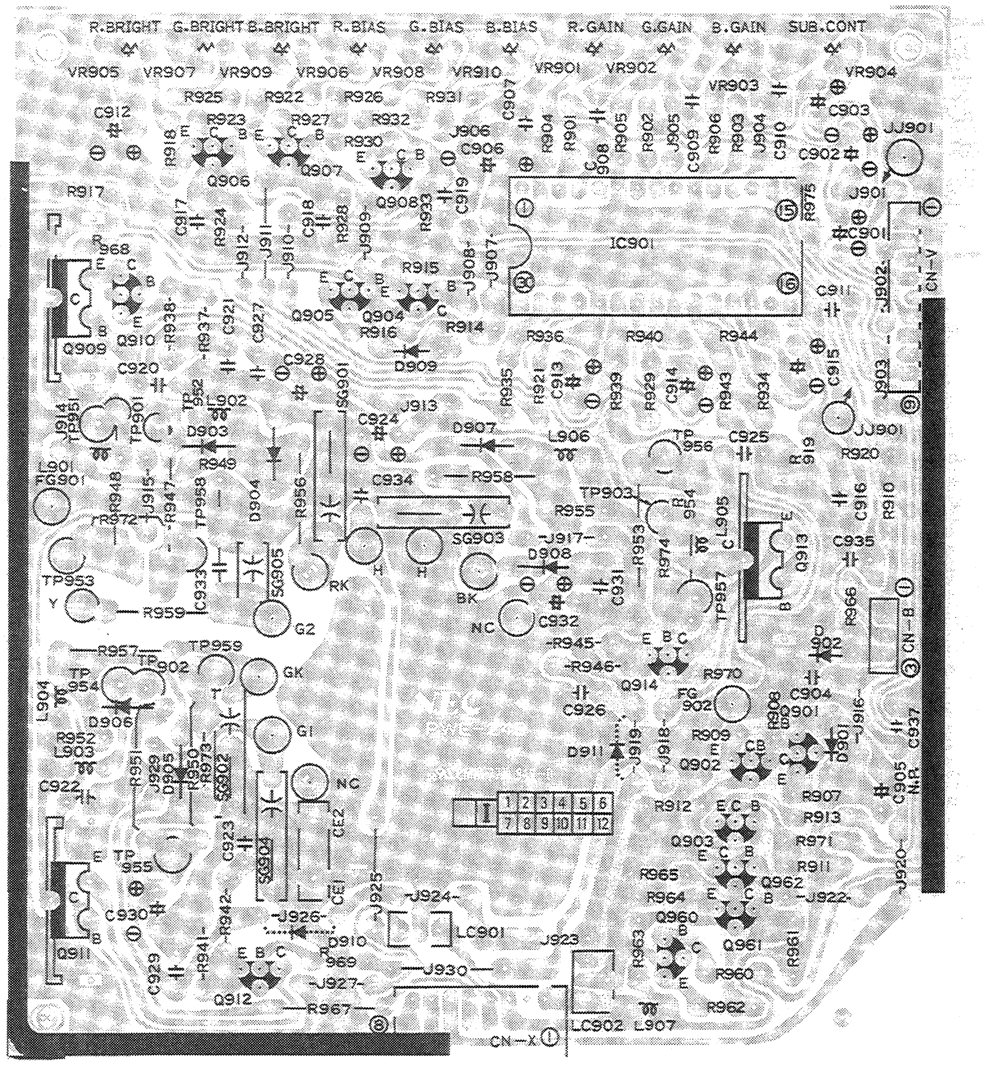
R105
R106
R107
R108
R123

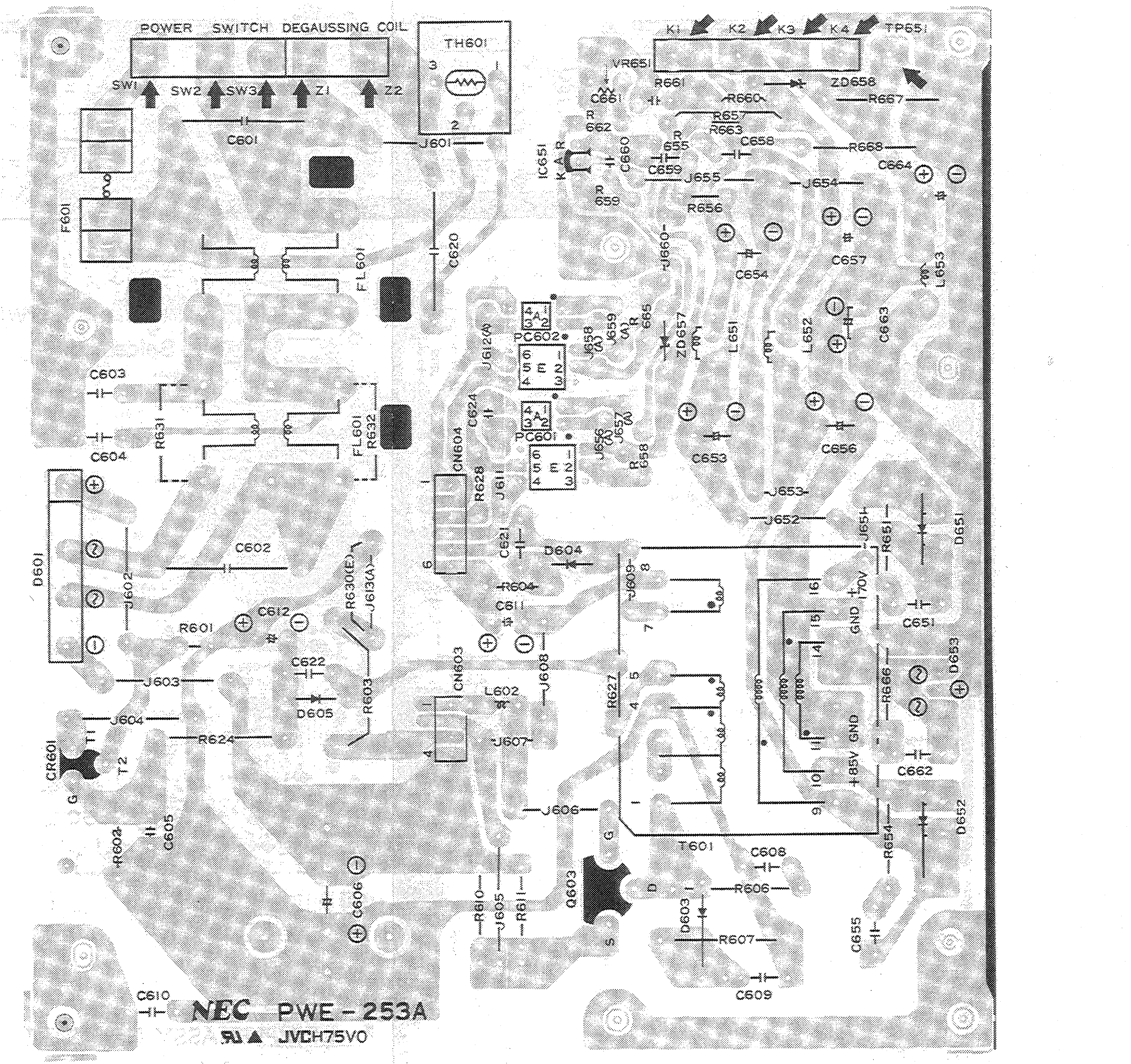
CONTROL PWB ASSY (PWE-248B)
– Solder side –


D550
PWE-240C
94V-0

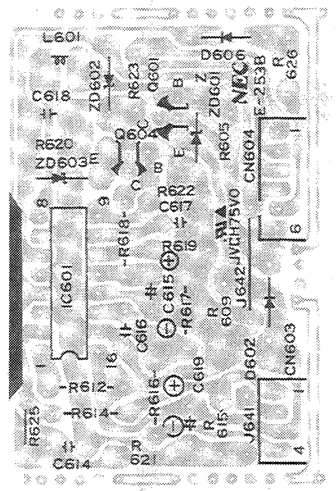
LED PWB ASSY (PWE-248C)
– Solder side –


R.BRIGHT
G.BRIGHT
B.BRIGHT
R.BIAS
G.BIAS
B.BIAS
R.GAIN
G.GAIN
B.GAIN
SUB.CONT
VR905
VR907
VR909
VR906
VR908
VR910
VR901
VR902
VR903
VR904
IC901
Q906
Q907
Q908
Q909
Q910
Q905
Q904
Q913
Q914
Q902
Q903
Q962
Q960
Q961
Q911
Q912
SG901
SG903
SG905
SG904
SG902
LC901
LC902
L907
CN-V
CN-B
CN-X
N.R
RK
GK
G1
G2
BK
NC
CE1
CE2
NEC
PWE-249

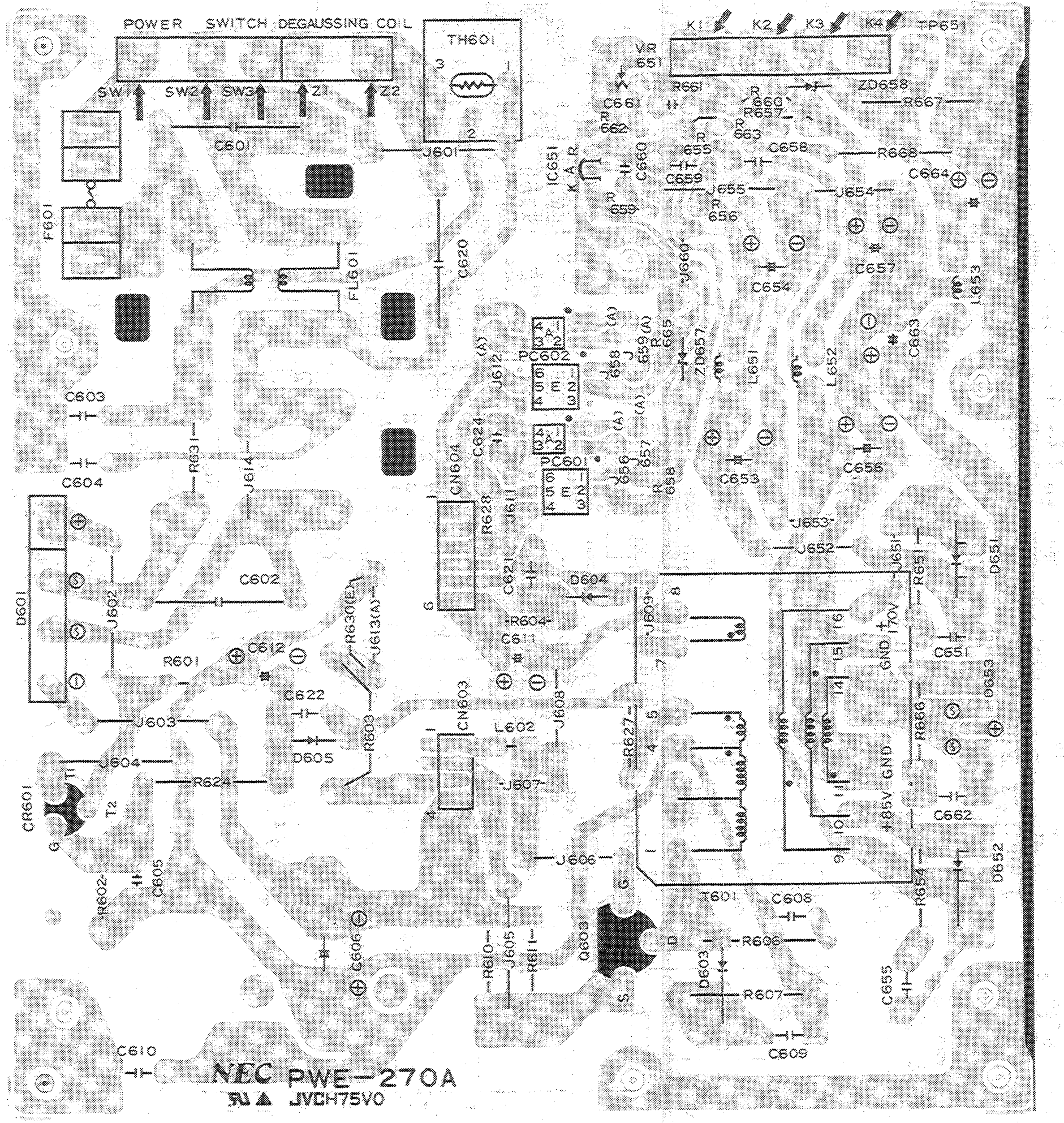
VIDEO/CRT PWB ASSY (PWE-249)
– Solder side –


POWER SWITCH
DEGAUSSING COIL
SW1
SW2
SW3
Z1
Z2
TH601
K1
K2
K3
K4
TP651
VR651
ZD658
IC651
F601
FL601
PC602
PC601
CN604
CN603
D601
CR601
Q603
T601
L602
L651
L652
L653
GND
170V
+85V
GND
NEC PWE-253A
JVCH75V0

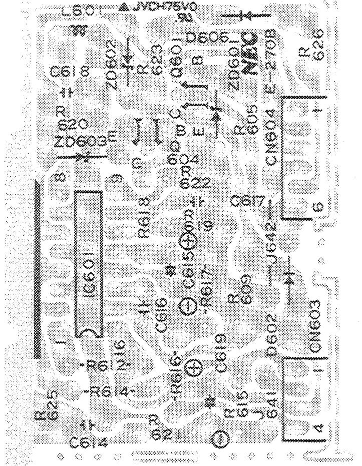
SW. REG. PWB ASSY (PWE-253A)
– Solder side –
models JC-1404HME/EE/R


L601
C618
ZD602
R623
Q601
D606
ZD601
R605
E-253B
R626
R620
ZD603
R622
C617
CN604
IC601
R618
C615
C619
R617
C616
J642
JVCH75VO
D602
CN603
R612
R616
R614
R625
C614
R621
R615
J641

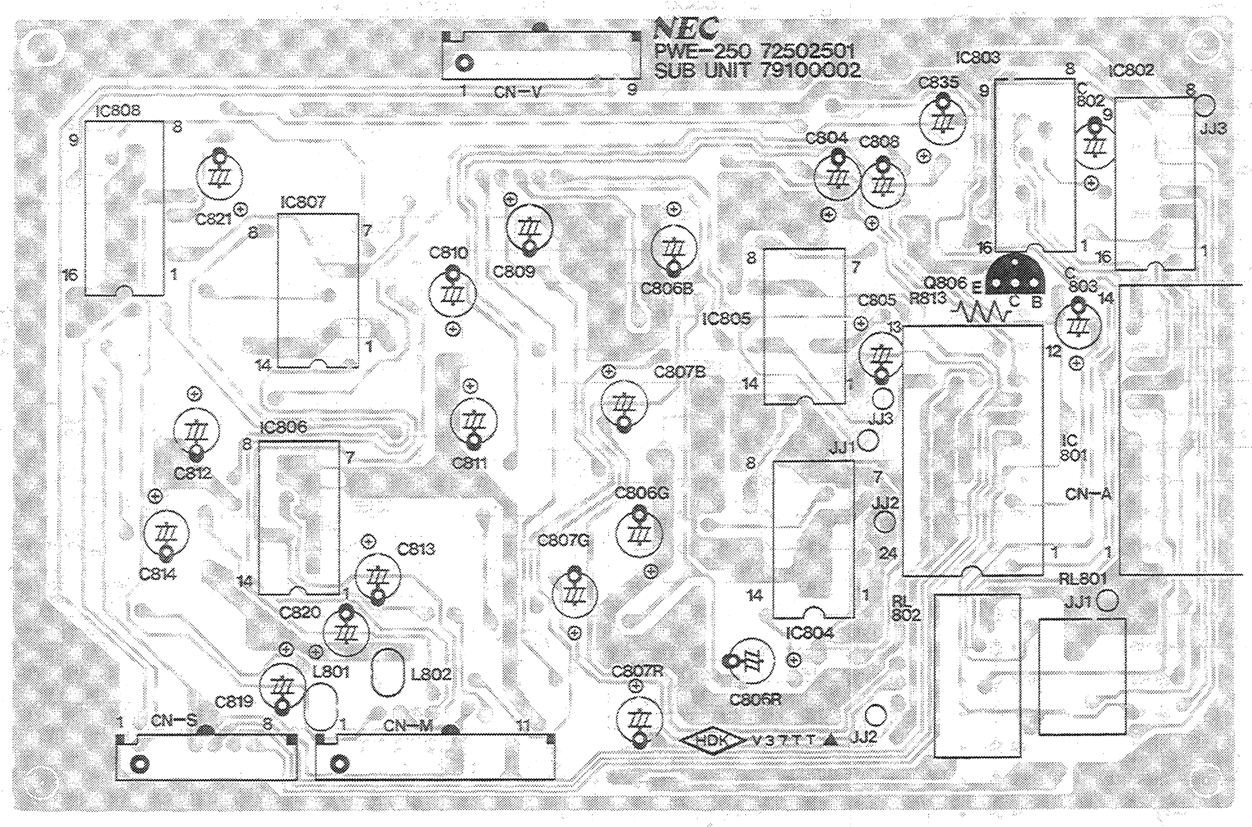
SW. REG. PWB ASSY (PWE-253B)
– Solder side –
models JC-1404HME/EE/R


POWER SWITCH DEGAUSSING COIL
TH601
SW1
SW2
SW3
Z1
Z2
C601
J601
F601
C620
FL601
VR 651
K1
K2
K3
K4
TP651
R661
ZD658
R667
C661
C660
R657
IC651
R662
C659
R655
R663
C658
R668
C664
J655
J654
R659
R656
J660
C654
C657
L653
PC602
J612
R658
R659
R665
ZD657
L651
L652
C663
C603
C624
PC601
R656
R657
R658
C653
C656
C604
R631
J614
CN604
R628
J611
J653
J652
J651
D651
D601
C602
C621
D604
R604
J609
C611
R651
C651
J602
R630(E)
J613(A)
C612
R601
C622
CN603
L602
J608
R627
GND
170V
D653
R666
J603
D605
R603
J604
R624
J607
+85V
C662
CR601
T1
T2
G
R602
C605
J606
R654
D652
T601
C608
C606
R610
J605
R611
Q603
D603
R606
R607
C655
C609
C610
NEC PWE-270A
JVCH75VO

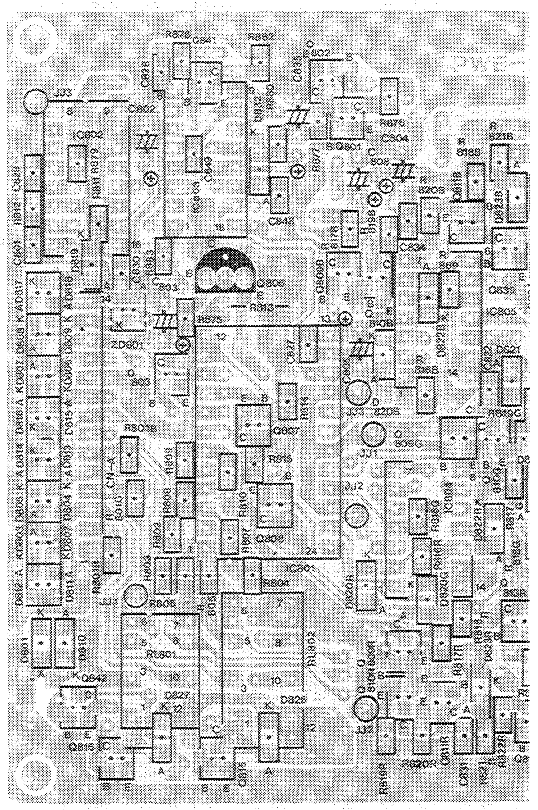
SW. REG. PWB ASSY (PWE-270A)
– Solder side –
model JC-1404HMED


L601
JVCH75VO
C618
ZD602
R623
Q601
D606
ZD601
E-270B
R626
R620
ZD603
R622
C617
CN604
IC601
R618
C615
C616
R617
J642
R609
D602
CN603
J616
R612
C619
R616
R614
R625
C614
R621
R615
J641

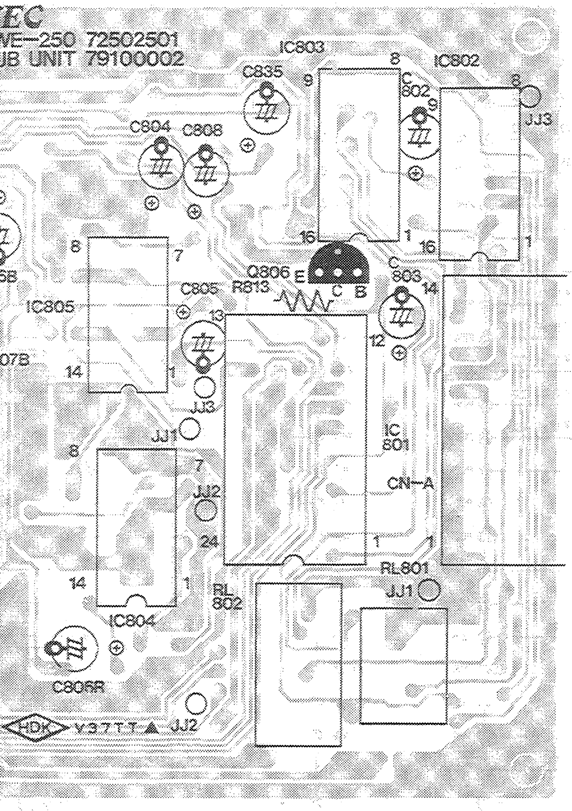
SW. REG. PWB ASSY (PWE-270B)
– Solder side –
model JC-1404HMED


NEC
PWE-250 72502501
SUB UNIT 79100002
CN-V
IC808
IC807
IC806
IC805
IC804
IC803
IC802
IC 801
Q806
R813
C802
C803
C804
C805
C806B
C806G
C806R
C807B
C807G
C807R
C808
C809
C810
C811
C812
C813
C814
C819
C820
C821
C835
L801
L802
CN-S
CN-M
CN-A
RL801
RL 802
JJ1
JJ2
JJ3
HDK
V37TT

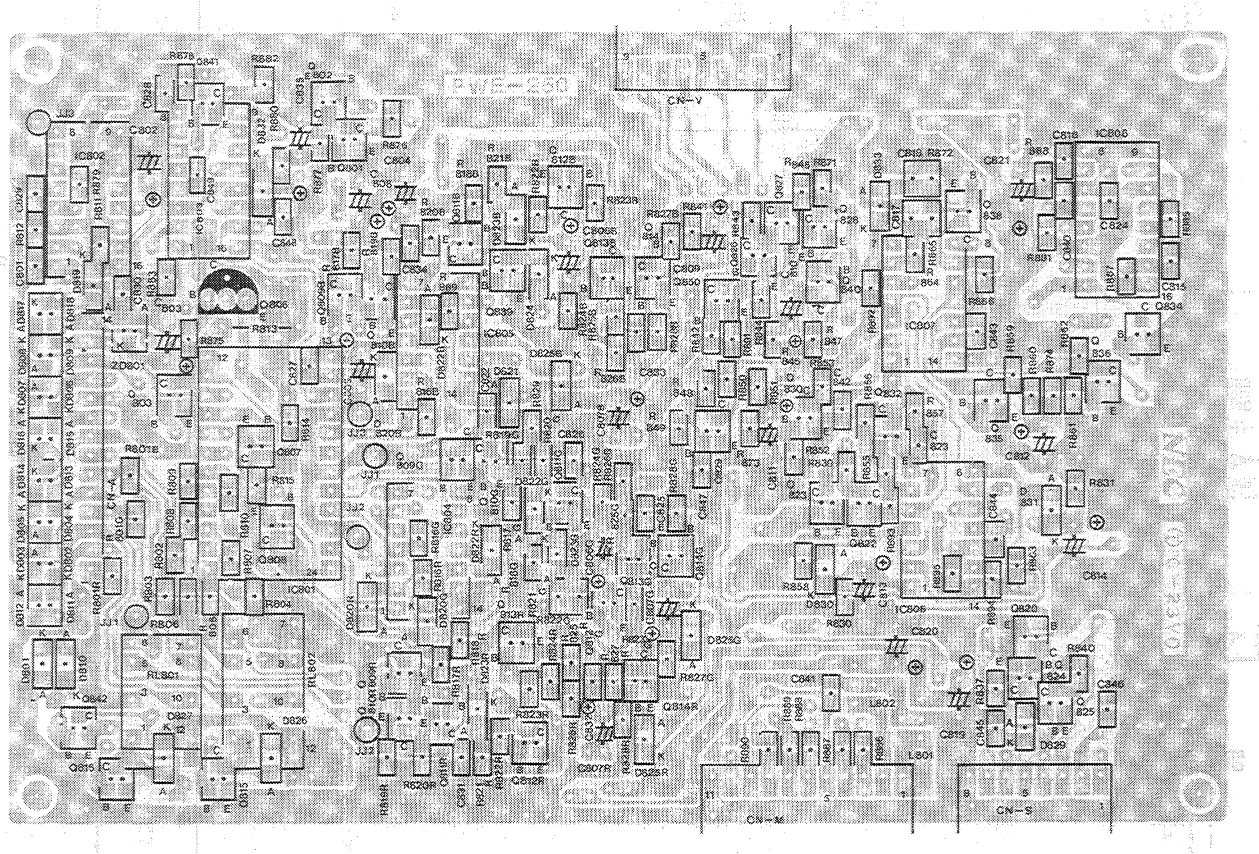
SUB PWB ASSY (PWE-250)
— Component side —



SUB


EC
WE-250 72502501
UB UNIT 79100002
IC803
IC802
C835
C804
C808
C802
IC805
Q806
R813
C805
C803
IC 801
CN-A
JJ1
JJ2
JJ3
RL 802
RL801
IC804
C806R
HDK
V37TT▲

WE-250)
de –

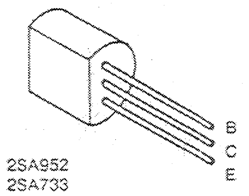

PWE-250
CN-V
IC806
IC807
IC805
CN-M
CN-S
RL801
RL802
IC801
IC802
L801
L802

SUB PWB ASSY (PWE-250)
– Solder side –

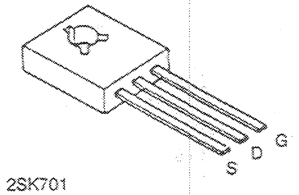
NEC
IC808
C824
L801
L802
CN-M
CN-S

WE-250)

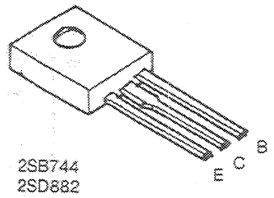
–



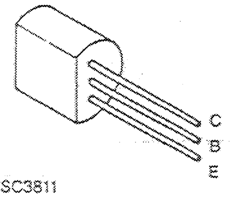
2SA952
2SA733
2SC945
2SC2002
AA1A4M
AA1L4M
2SC1473
2SA1018



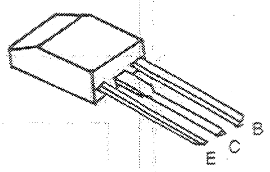
2SK701



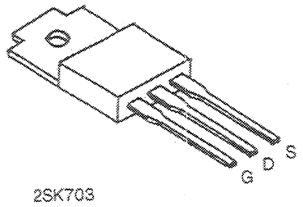
2SB744
2SD882
2SD986



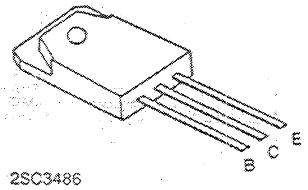
2SC3811



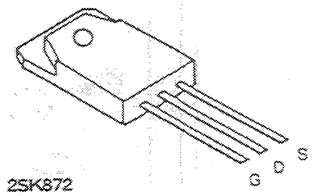
2SD1581



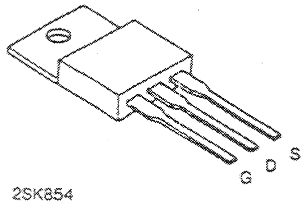
2SK703
2SK752
2SK758



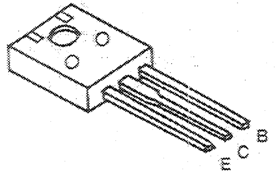
2SC3486



2SK872



2SK854

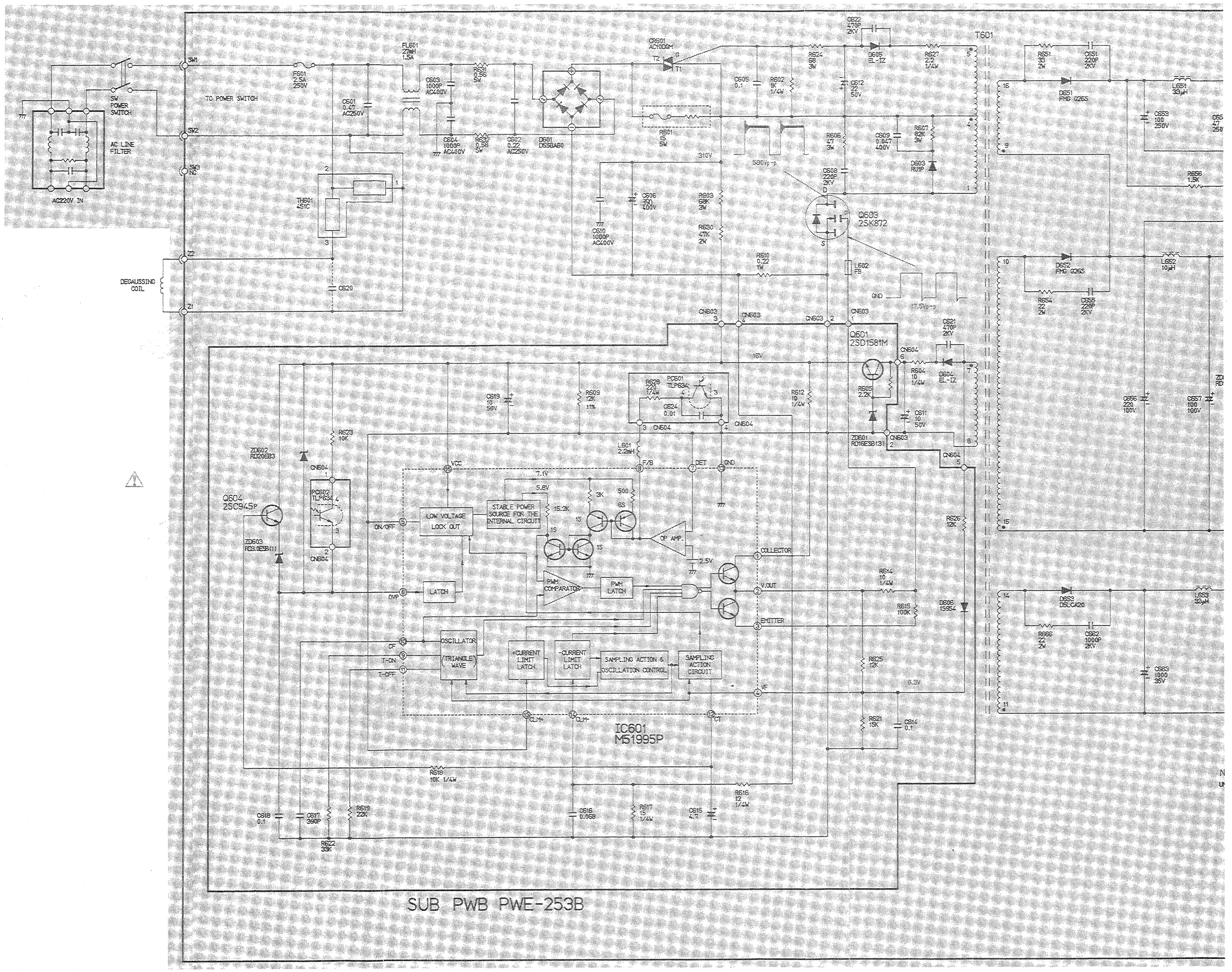


2SC3953

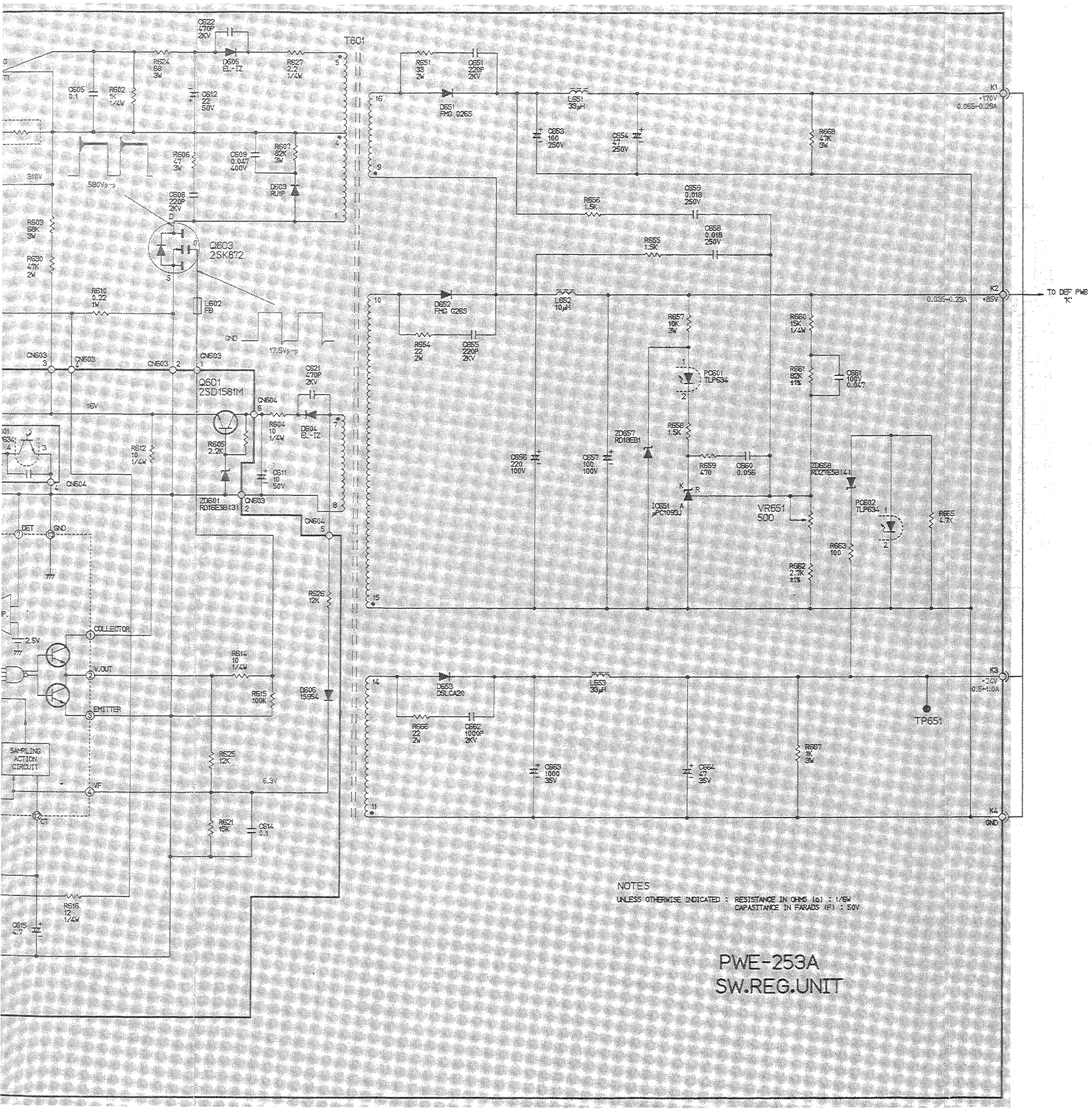
NOTE:

E: EMITTER
B: BASE
C: COLLECTOR
G: GATE
D: DRAIN
S: SOURCE

MODEL JC-1404HME/**EE/R**
SCHEMATIC DIAGRAM 1

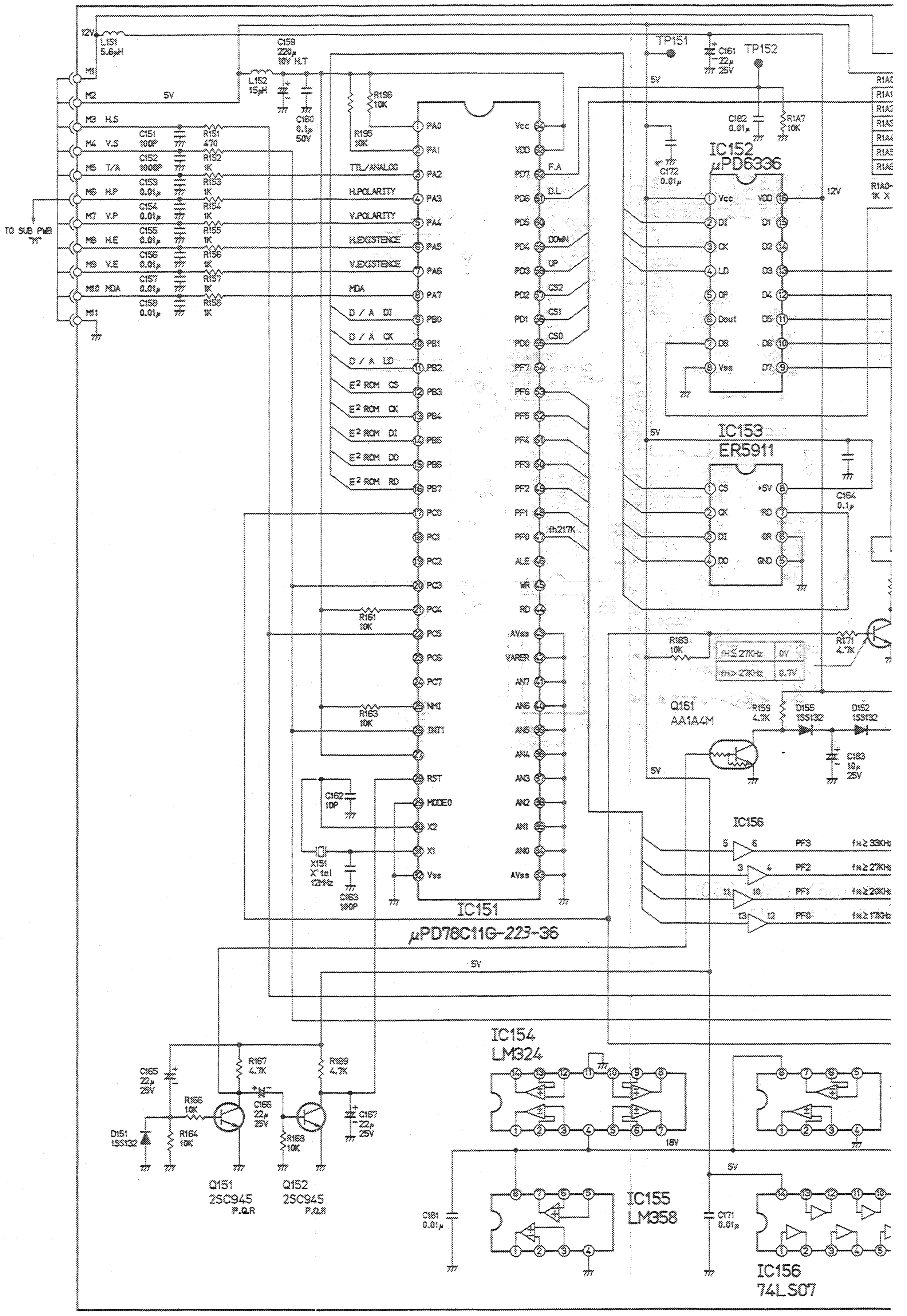

AC220V IN
AC LINE FILTER
SW POWER SWITCH
TO POWER SWITCH
SW1
SW2
SW3 NC
Z2
Z1
DEGAUSSING COIL
F601 2.5A 250V
C601 0.47 AC250V
FL601 27mH 1.5A
C603 1000P AC400V
C604 1000P AC400V
R631 0.56 5W
R632 0.56 5W
C602 0.22 AC250V
D601 D5SBA60
TH601 451C
C620
CR601 AC10DGM
R601 15 5W
310V
C606 330 400V
C610 1000P AC400V
R603 68K 3W
R630 47K 2W
R610 0.22 1W
C605 0.1
R602 1K 1/4W
R624 68 3W
C622 470P 2KV
D605 EL-1Z
C612 22 50V
R627 22 1/4W
R606 47 3W
C609 0.047 400V
R607 82K 3W
D603 RU1P
580Vp-p
C608 220P 2KV
Q603 2SK872
L602 FB
GND
17.5Vp-p
T601
Q601 2SD1581M
C621 470P 2KV
R604 10 1/4W
D604 EL-1Z
R605 2.2K
C611 10 50V
ZD601 RD16ESB1(1)
CN603
CN604
15V
C619 10 50V
R609 12K ±1%
R629 220 1/4W
PC601 TLP634
C624 0.01
R612 10 1/4W
R623 10K
L601 2.2mH
ZD602 RD20EB3
Q604 2SC945P
PC602 TLP634
ZD603 RD3.0ESB(1)
VCC
7.1V
5.8V
F/B
DET
GND
LOW VOLTAGE LOCK OUT
STABLE POWER SOURCE FOR THE INTERNAL CIRCUIT
15.2K
3K
500
OP AMP.
2.5V
ON/OFF
OVP
LATCH
PWM COMPARATOR
PWM LATCH
COLLECTOR
V.OUT
EMITTER
CF
T-ON
T-OFF
OSCILLATOR (TRIANGLE WAVE)
+CURRENT LIMIT LATCH
-CURRENT LIMIT LATCH
SAMPLING ACTION & OSCILLATION CONTROL
SAMPLING ACTION CIRCUIT
VF
CLM+
CLM-
CT
IC601 M51995P
R614 10 1/4W
R615 100K
D606 1SS54
R626 12K
R625 12K
6.3V
R621 15K
C614 0.1
R618 10K 1/4W
R616 12 1/4W
C616 0.068
R617 15 1/4W
C615 4.7
C618 0.1
C617 330P
R619 22K
R622 33K
SUB PWB PWE-253B
R651 33 2W
C651 220P 2KV
D651 FMG G26S
L651 33μH
C653 100 250V
R656 1.5K
D652 FMG G26S
L652 10μH
R654 22 2W
C655 220P 2KV
C656 220 100V
C657 100 160V
D653 D5LC A20
L653 33μH
R666 22 2W
C662 1000P 2KV
C663 1000 35V

7816333□

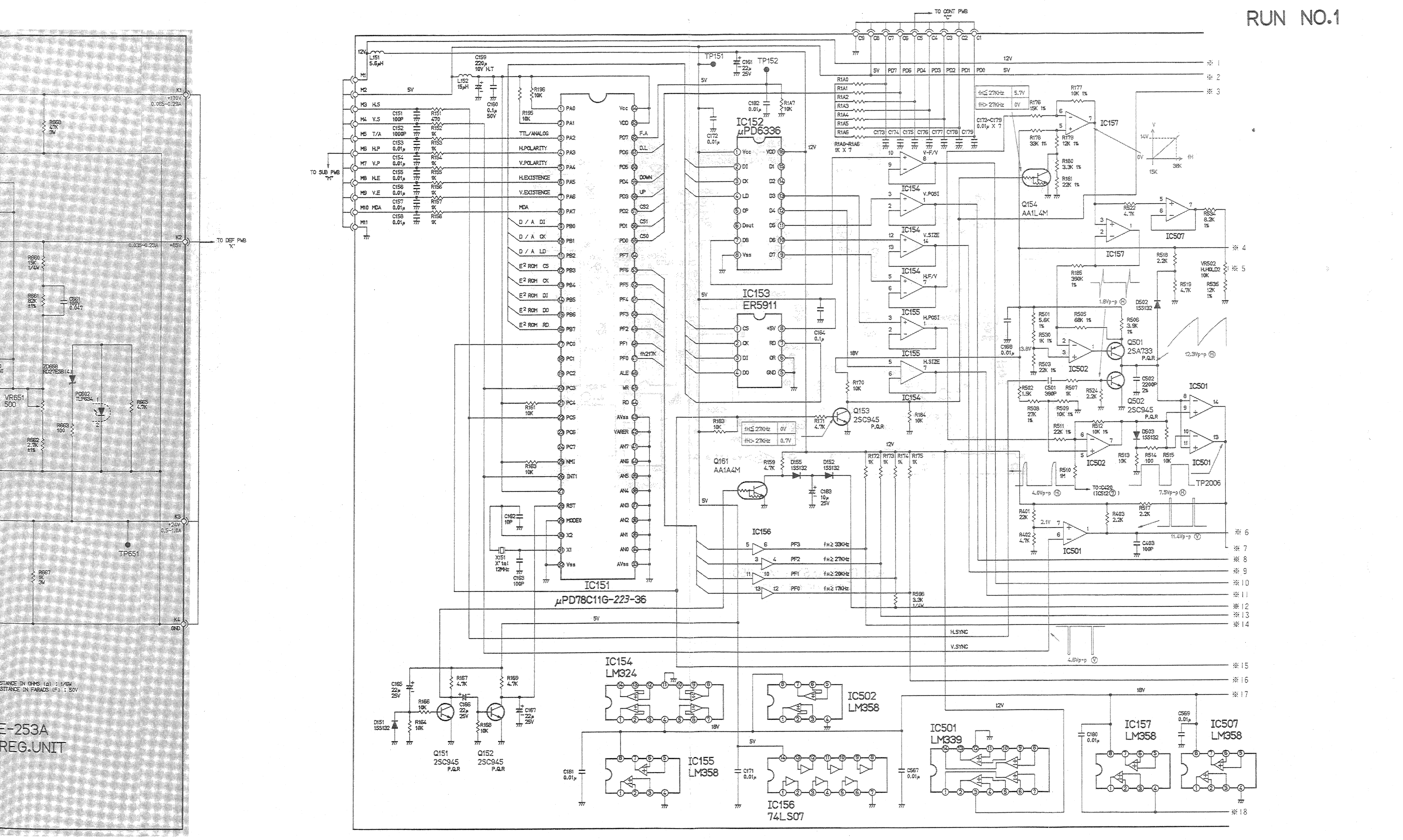

T601
Q603
2SK872
Q601
2SD1581M
ZD601
RD16ESB(3)
D605
EL-1Z
D604
EL-1Z
D603
RU1P
D651
FMG G26S
D652
FMG G26S
D653
D5LC420
L651
33μH
L652
10μH
L653
33μH
PC601
TLP634
PC602
TLP634
ZD657
RD18EB1
ZD658
RD27ESB(4)
IC651
μPC1093J
VR651
500
TP651
K1
+170V
0.065~0.29A
K2
+85V
0.055~0.23A
TO DEF PWB "K"
K3
+24V
0.5~1.0A
K4
GND
580Vp-p
17.5Vp-p
310V
15V
CN503
CN504
CN506
COLLECTOR
V.OUT
EMITTER
SAMPLING ACTION CIRCUIT
DET
GND
6.3V
2.5V

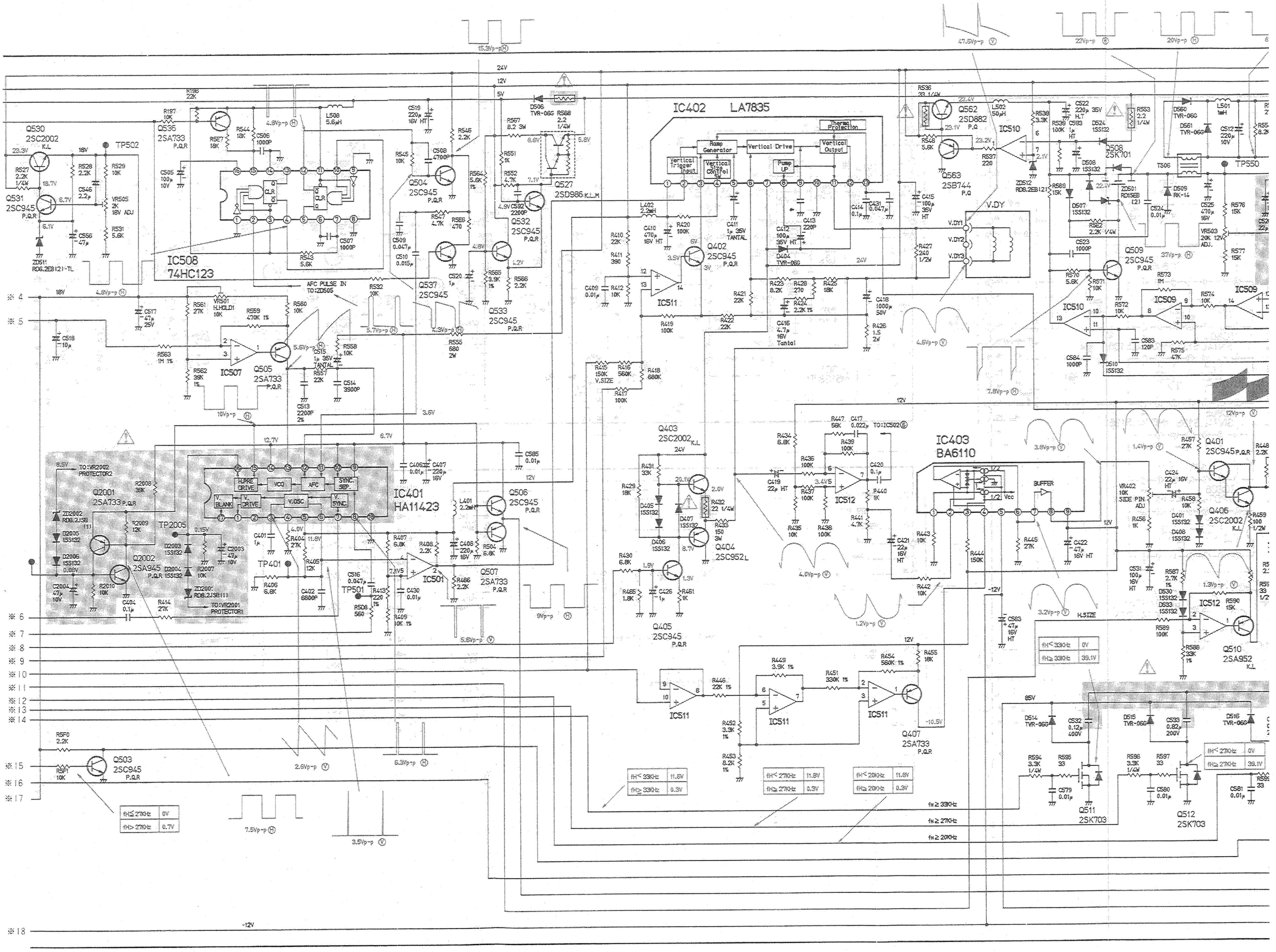
NOTES
UNLESS OTHERWISE INDICATED : RESISTANCE IN OHMS (Ω) : 1/6W
CAPASITANCE IN FARADS (F) : 50V

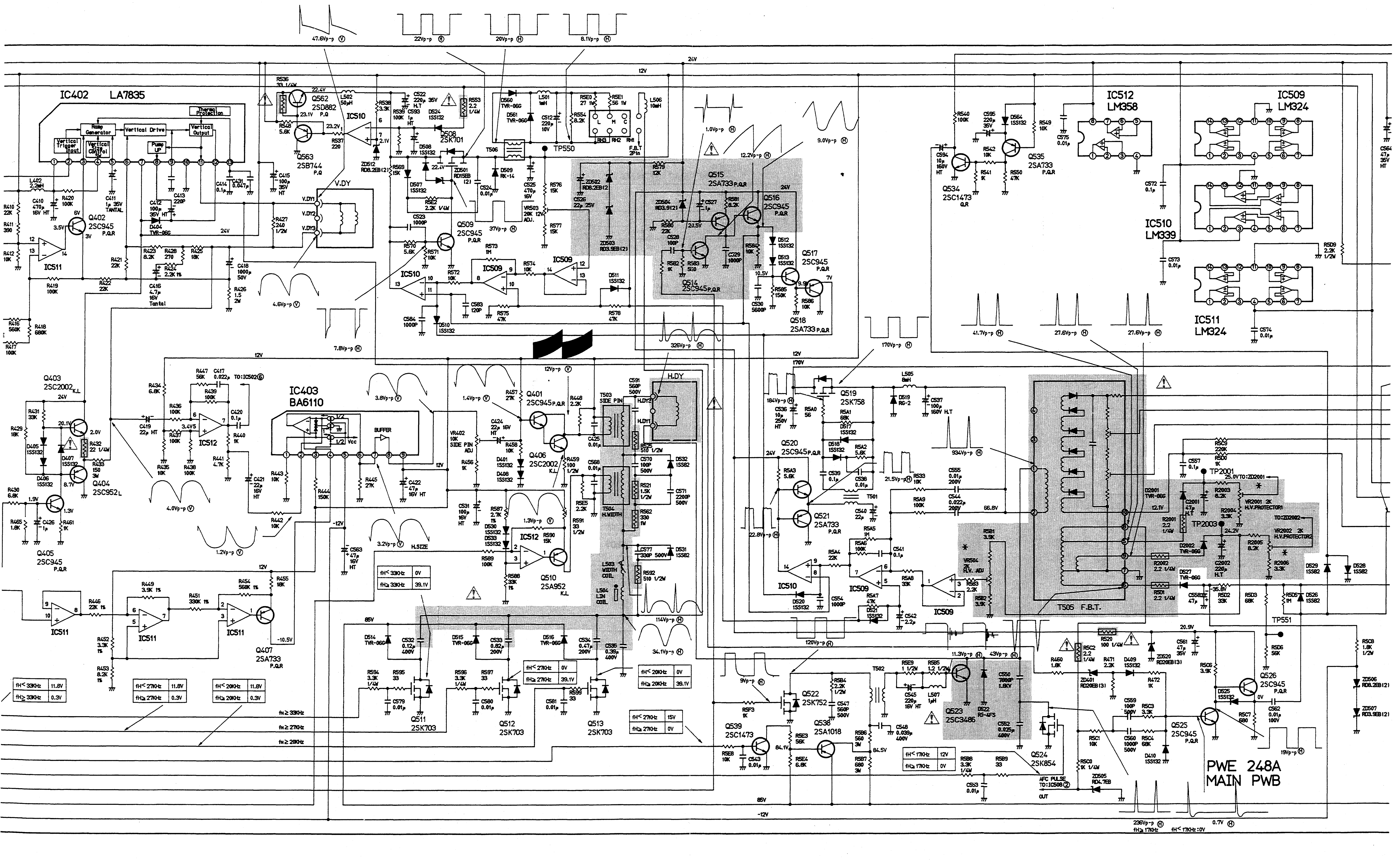
PWE-253A
SW.REG.UNIT


TO SUB PWB "M"
12V
5V
L151
5.6μH
L152
15μH
M1
M2
M3 H.S
M4 V.S
M5 T/A
M6 H.P
M7 V.P
M8 H.E
M9 V.E
M10 MDA
M11
TTL/ANALOG
H.POLARITY
V.POLARITY
H.EXISTENCE
V.EXISTENCE
MDA
D/A DI
D/A CK
D/A LD
E² ROM CS
E² ROM CK
E² ROM DI
E² ROM DO
E² ROM RD
PA0
PA1
PA2
PA3
PA4
PA5
PA6
PA7
PB0
PB1
PB2
PB3
PB4
PB5
PB6
PB7
PC0
PC1
PC2
PC3
PC4
PC5
PC6
PC7
NMI
INT1
RST
MODE0
X2
X1
Vss
Vcc
VDD
PD7
PD6
PD5
PD4
PD3
PD2
PD1
PD0
PF7
PF6
PF5
PF4
PF3
PF2
PF1
PF0
ALE
WR
RD
AVss
VAREF
AN7
AN6
AN5
AN4
AN3
AN2
AN1
AN0
AVss
F.A
D.L
DOWN
UP
CS2
CS1
CS0
fh217K
IC151
μPD78C11G-223-36
X151
X'tal
12MHz
TP151
TP152
IC152
μPD6336
IC153
ER5911
Q161
AA1A4M
fH≦27KHz 0V
fH>27KHz 0.7V
D155
1SS132
D152
1SS132
IC156
PF3 fH≧33KHz
PF2 fH≧27KHz
PF1 fH≧20KHz
PF0 fH≧17KHz
IC154
LM324
IC155
LM358
IC156
74LS07
Q151
2SC945
P.Q.R
Q152
2SC945
P.Q.R
D151
1SS132
18V

RUN NO.1

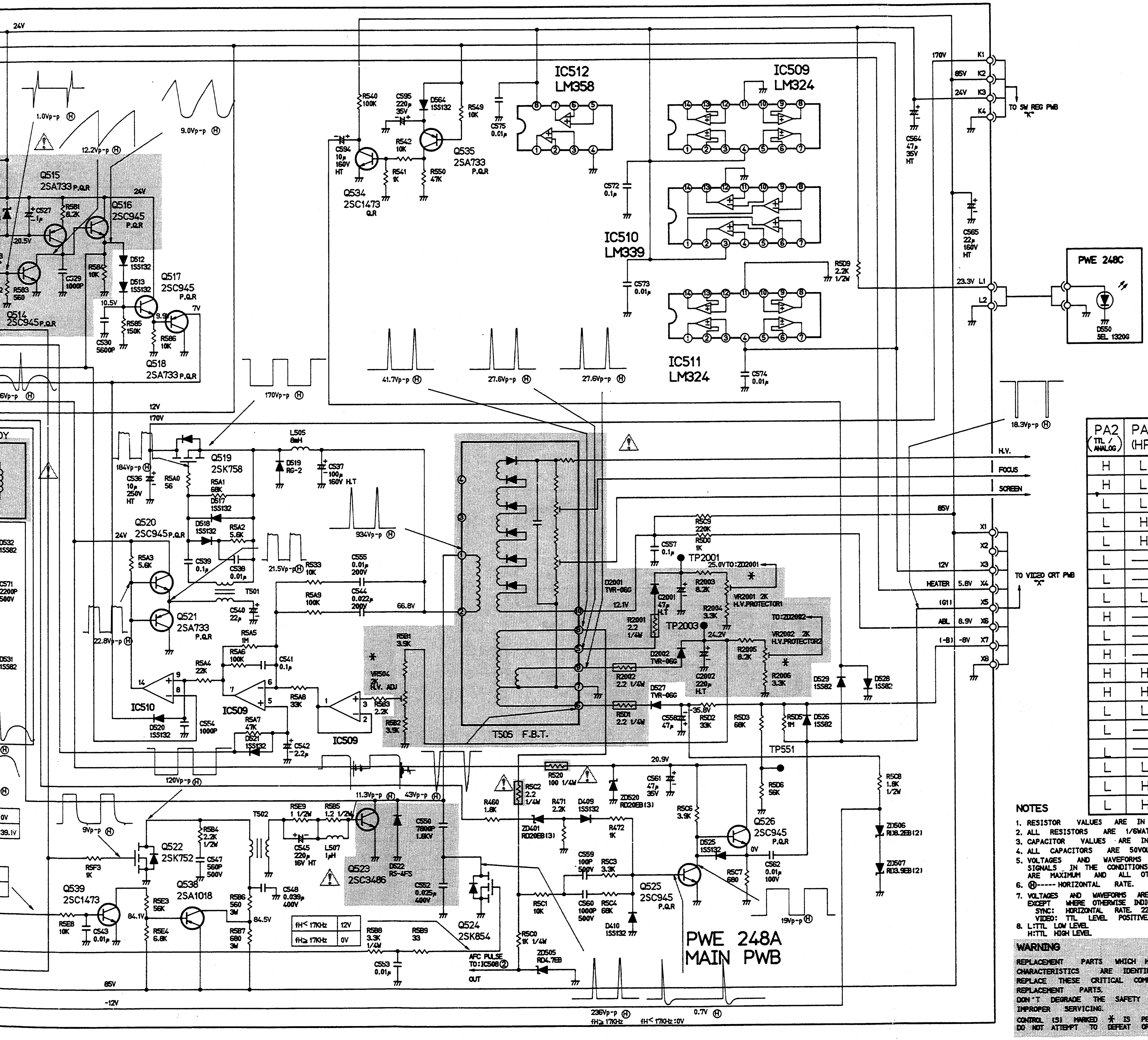

TO CONT PWB "C"
C9 C8 C7 C6 C5 C4 C3 C2 C1
12V
5V PD7 PD6 PD5 PD4 PD3 PD2 PD1 PD0 5V
※1
※2
※3
※4
※5
※6
※7
※8
※9
※10
※11
※12
※13
※14
※15
※16
※17
※18
TO SUB PWB "H"
M1 M2 M3 H.S M4 V.S M5 T/A M6 H.P M7 V.P M8 H.E M9 V.E M10 MDA M11
L151 5.6µH
L152 15µH
C159 220µ 10V H.T
C160 0.1µ 50V
R195 10K
R196 10K
C151 100P
C152 1000P
C153 0.01µ
C154 0.01µ
C155 0.01µ
C156 0.01µ
C157 0.01µ
C158 0.01µ
R151 470
R152 1K
R153 1K
R154 1K
R155 1K
R156 1K
R157 1K
R158 1K
TTL/ANALOG
H.POLARITY
V.POLARITY
H.EXISTENCE
V.EXISTENCE
MDA
D/A DI
D/A CK
D/A LD
E² ROM CS
E² ROM CK
E² ROM DI
E² ROM DO
E² ROM RD
PA0 PA1 PA2 PA3 PA4 PA5 PA6 PA7
PB0 PB1 PB2 PB3 PB4 PB5 PB6 PB7
PC0 PC1 PC2 PC3 PC4 PC5 PC6 PC7
NMI INT1 RST MODE0 X2 X1 Vss
Vcc VDD PD7 PD6 PD5 PD4 PD3 PD2 PD1 PD0
PF7 PF6 PF5 PF4 PF3 PF2 PF1 PF0
ALE WR RD AVss VAREF AN7 AN6 AN5 AN4 AN3 AN2 AN1 AN0 AVss
F.A D.L DOWN UP CS2 CS1 CS0 fh≥17K
R161 10K
R163 10K
C162 10P
X151 X'tal 12MHz
C163 100P
IC151
µPD78C11G-223-36
TP151 TP152
C161 22µ 25V
C182 0.01µ
R1A7 10K
C172 0.01µ
IC152 µPD6336
Vcc DI CK LD DP Dout DS Vss
VDD D1 D2 D3 D4 D5 D6 D7
IC153 ER5911
CS CK DI DO +5V RD OR GND
C164 0.1µ
R1A0 R1A1 R1A2 R1A3 R1A4 R1A5 R1A6
R1A0~R1A6 1K X 7
C173 C174 C175 C176 C177 C178 C179
C173~C179 0.01µ X 7
fH≦27KHz 5.7V
fH>27KHz 0V
R176 15K 1%
R177 10K 1%
R178 33K 1%
R179 12K 1%
R180 3.3K 1%
R181 22K 1%
IC157
Q154 AA1L4M
14V 0V 15K 36K fH V
V-F/V
IC154 V.POSI
IC154 V.SIZE
IC154 H.F/V
IC155 H.POSI
IC155 H.SIZE
IC154
R522 4.7K
R534 8.2K 1%
IC507
R518 2.2K
R519 4.7K
VR502 H.HOLD2 10K
R535 12K 1%
R185 390K 1%
1.8Vp-p Ⓗ
D502 1SS132
R501 5.6K 1%
R505 68K 1%
R506 3.9K 1%
R530 1K 1%
R503 22K 1%
C168 0.01µ
13.8V
Q501 2SA733 P.Q.R
12.3Vp-p Ⓗ
IC502
C502 2200P 2%
Q502 2SC945 P.Q.R
R502 1.5K
C501 390P
R507 1K
R524 2.2K
R508 27K 1%
R509 10K 1%
R511 22K 1%
R512 10K 1%
D503 1SS132
IC501
R513 10K
R514 100
R515 10K
TP2006
7.5Vp-p Ⓗ
4.0Vp-p Ⓗ
R510 1M
TO:C420 (IC512⑦)
R401 22K
R402 4.7K
2.1V
R403 2.2K
R517 2.2K
C403 100P
11.4Vp-p Ⓥ
18V
R170 10K
R184 10K
R183 10K
fH≦27KHz 0V
fH>27KHz 0.7V
R171 4.7K
Q153 2SC945 P.Q.R
Q161 AA1A4M
R159 4.7K
D155 1SS132
D152 1SS132
C183 10µ 25V
R172 1K
R173 1K
R174 1K
R175 1K
IC156
PF3 fH≧33KHz
PF2 fH≧27KHz
PF1 fH≧20KHz
PF0 fH≧17KHz
R596 3.3K 1/4W
H.SYNC
V.SYNC
4.6Vp-p Ⓥ
C165 22µ 25V
R167 4.7K
R169 4.7K
R166 10K
R164 10K
C166 22µ 25V
R168 10K
C167 22µ 25V
D151 1SS122
Q151 2SC945 P.Q.R
Q152 2SC945 P.Q.R
IC154 LM324
IC502 LM358
IC155 LM358
C181 0.01µ
C171 0.01µ
IC156 74LS07
C567 0.01µ
IC501 LM339
C180 0.01µ
IC157 LM358
C569 0.01µ
IC507 LM358
K1 +170V 0.065~0.29A
K2 +85V 0.035~0.23A
K3 +24V 0.5~1.0A
K4 GND
TO DEF PWB "K"
R668 47K 3W
R660 15K 1/4W
R661 82K ±1%
C661 100V 0.047
ZD658 RD27ESB(4)
PC602 TLP634
VR651 500
R665 4.7K
R663 100
R662 2.7K ±1%
TP651
R667 1K 3W
STANCE IN OHMS (Ω) : 1/6W
STANCE IN FARADS (F) : 50V
E-253A
REG.UNIT


IC402 LA7835
Ramp Generator
Vertical Drive
Thermal Protection
Vertical Output
Vertical Trigger Input
Vertical Size Control
Pump UP
IC508 74HC123
IC401 HA11423
H.PRE DRIVE
VCO
AFC
SYNC SEP.
V. BLANK
V. DRIVE
V.OSC
V. SYNC
IC403 BA6110
BUFFER
IC507
IC501
IC510
IC511
IC512
IC509
V.DY
V.DY1
V.DY2
V.DY3
Q530 2SC2002
Q531 2SC945
Q535 2SA733
Q504 2SC945
Q532 2SC945
Q527 2SD986
Q537 2SC945
Q533 2SC945
Q505 2SA733
Q506 2SC945
Q507 2SA733
Q2001 2SA733
Q2002 2SA945
Q402 2SC945
Q403 2SC2002
Q404 2SC952
Q405 2SC945
Q407 2SA733
Q503 2SC945
Q562 2SD882
Q563 2SB744
Q509 2SC945
Q401 2SC945
Q406 2SC2002
Q510 2SA952
Q511 2SK703
Q512 2SK703
TP502
TP2005
TP401
TP501
TP550
T506
VR505 2K 18V ADJ
VR501 H.HOLD1 10K
VR402 10K SIDE PIN ADJ
VR503 20K ADJ.
R415 150K V.SIZE
H.SIZE
AFC PULSE IN TO:ZD505
TO:VR2002 PROTECTOR2
TO:VR2001 PROTECTOR1
TO:IC502⑥
※1
※2
※3
※4
※5
※6
※7
※8
※9
※10
※11
※12
※13
※14
※15
※16
※17
※18
24V
12V
5V
18V
-12V
85V
15.3Vp-p Ⓗ
47.5Vp-p Ⓥ
22Vp-p Ⓗ
20Vp-p Ⓗ
4.8Vp-p Ⓗ
5.7Vp-p Ⓗ
4.3Vp-p Ⓗ
10Vp-p Ⓗ
9Vp-p Ⓗ
5.6Vp-p Ⓥ
2.6Vp-p Ⓥ
6.3Vp-p Ⓗ
7.5Vp-p Ⓗ
3.5Vp-p Ⓥ
4.6Vp-p Ⓥ
7.8Vp-p Ⓗ
3.8Vp-p Ⓥ
1.4Vp-p Ⓥ
4.0Vp-p Ⓥ
1.2Vp-p Ⓥ
3.2Vp-p Ⓥ
1.3Vp-p Ⓥ
12Vp-p Ⓗ
fH≦27KHz 0V
fH>27KHz 0.7V
fH<33KHz 11.6V
fH≧33KHz 0.3V
fH<27KHz 11.8V
fH≧27KHz 0.3V
fH<20KHz 11.8V
fH≧20KHz 0.3V
fH<33KHz 0V
fH≧33KHz 39.1V
fH<27KHz 0V
fH≧27KHz 39.1V
fH≧33KHz
fH≧27KHz
fH≧20KHz



PWE 248A
MAIN PWB
IC402 LA7835
Ramp Generator
Vertical Drive
Vertical Output
Thermal Protection
Vertical Trigger Input
Vertical Size Control
Pump UP
IC403 BA6110
BUFFER
IC510 LM339
IC512 LM358
IC509 LM324
IC511 LM324
IC510
IC509
IC511
IC512
T505 F.B.T.
T503 SIDE PIN
T504 H.WIDTH
T506
T501
T502
V.DY
H.DY
L503 WIDTH COIL
L504 LIN COIL
TP550
TP551
TP2001
TP2003
Q562 2SD882 P.Q
Q563 2SB744 P.Q
Q508 2SK701
Q509 2SC945 P.Q.R
Q402 2SC945 P.Q.R
Q403 2SC2002 K.L
Q404 2SC952 L
Q405 2SC945 P.Q.R
Q407 2SA733 P.Q.R
Q401 2SC945 P.Q.R
Q406 2SC2002 K.L
Q510 2SA952 K.L
Q511 2SK703
Q512 2SK703
Q513 2SK703
Q515 2SA733 P.Q.R
Q516 2SC945 P.Q.R
Q514 2SC945 P.Q.R
Q517 2SC945 P.Q.R
Q518 2SA733 P.Q.R
Q519 2SK758
Q520 2SC945 P.Q.R
Q521 2SA733 P.Q.R
Q522 2SK752
Q523 2SC3486
Q524 2SK854
Q525 2SC945 P.Q.R
Q526 2SC945 P.Q.R
Q534 2SC1473 Q.R
Q535 2SA733 P.Q.R
Q538 2SA1018
Q539 2SC1473
47.6Vp-p Ⓥ
22Vp-p Ⓗ
20Vp-p Ⓗ
8.1Vp-p Ⓗ
1.0Vp-p Ⓗ
12.2Vp-p Ⓗ
9.0Vp-p Ⓗ
4.6Vp-p Ⓥ
7.8Vp-p Ⓗ
37Vp-p Ⓗ
326Vp-p Ⓗ
170Vp-p Ⓗ
41.7Vp-p Ⓗ
27.6Vp-p Ⓗ
27.6Vp-p Ⓗ
12Vp-p Ⓥ
3.8Vp-p Ⓥ
1.4Vp-p Ⓥ
184Vp-p Ⓗ
934Vp-p Ⓗ
21.5Vp-p Ⓗ
22.8Vp-p Ⓗ
4.0Vp-p Ⓥ
1.2Vp-p Ⓥ
3.2Vp-p Ⓥ
1.3Vp-p Ⓥ
114Vp-p Ⓗ
34.1Vp-p Ⓗ
120Vp-p Ⓗ
9Vp-p Ⓗ
11.3Vp-p Ⓗ
43Vp-p Ⓗ
19Vp-p Ⓗ
236Vp-p Ⓗ
fH≥ 17KHz
fH< 17KHz :0V
0.7V Ⓗ
24V
12V
170V
85V
-12V
20.9V
H.SIZE
SIDE PIN ADJ
H.V. ADJ
H.V.PROTECTOR1
H.V.PROTECTOR2
TO:ZD2001
TO:ZD2002
TO:IC502⑥
AFC PULSE TO:IC508② OUT
F.B.T. 2Pin
fH< 33KHz 0V
fH≥ 33KHz 39.1V
fH< 33KHz 11.8V
fH≥ 33KHz 0.3V
fH< 27KHz 11.8V
fH≥ 27KHz 0.3V
fH< 20KHz 11.8V
fH≥ 20KHz 0.3V
fH< 27KHz 0V
fH≥ 27KHz 39.1V
fH< 20KHz 0V
fH≥ 20KHz 39.1V
fH< 27KHz 15V
fH≥ 27KHz 0V
fH< 17KHz 12V
fH≥ 17KHz 0V
fH≥ 33KHz
fH≥ 27KHz
fH≥ 20KHz

RUN NO.1


IC512
LM358
IC509
LM324
IC510
LM339
IC511
LM324
Q534
2SC1473
Q535
2SA733
Q515
2SA733
Q516
2SC945
Q514
2SC945
Q517
2SC945
Q518
2SA733
Q519
2SK758
Q520
2SC945
Q521
2SA733
Q522
2SK752
Q538
2SA1018
Q539
2SC1473
Q523
2SC3486
Q524
2SK854
Q525
2SC945
Q526
2SC945
T505 F.B.T.
T501
T502
TP2001
TP2003
TP551
VR2001 2K H.V.PROTECTOR1
VR2002 2K H.V.PROTECTOR2
VR504 2K H.V. ADJ
TO SW REG PWB "K"
TO VIDEO CRT PWB "X"
PWE 248C
D550 SEL 1320G
H.V.
FOCUS
SCREEN
HEATER
AFC PULSE TO:IC508②
1.0Vp-p Ⓗ
12.2Vp-p Ⓗ
9.0Vp-p Ⓗ
170Vp-p Ⓗ
41.7Vp-p Ⓗ
27.6Vp-p Ⓗ
27.6Vp-p Ⓗ
18.3Vp-p Ⓗ
934Vp-p Ⓗ
184Vp-p Ⓗ
21.5Vp-p Ⓗ
22.8Vp-p Ⓗ
120Vp-p Ⓗ
11.3Vp-p Ⓗ
43Vp-p Ⓗ
9Vp-p Ⓗ
19Vp-p Ⓗ
236Vp-p Ⓗ
0.7V Ⓗ
PWE 248A
MAIN PWB

PD0 (CS0)	PD1 (CS1)	PD2 (CS2)	
L	L	L	――
L	L	H	BRIGHT
L	H	L	CONT
L	H	H	H.POSI
H	L	L	H.SIZE
H	L	H	V.POSI
H	H	L	V.SIZE
H	H	H	DISABLE

PD3	PD4	
H	L	UP
L	H	DOWN
H	H	DISABLE

PD6	PD7	
L	L	USER CONTROL MODE
L	H	FACTORY ADJ. MODE
H	L	DATA LOAD
H	H	FACTORY DATA WRITING

PA2 (TTL / ANALOG)	PA3 (HP)	PA4 (VP)	PA5 (HE)	PA6 (VE)	PA7 (MODE)	FH	Fv	
H	L	L	H	H	L	――	0	CGA
H	L	H	H	H	L	――	0	EGA
L	L	H	H	H	L	(i)	0	VGA 350
L	H	L	H	H	L	(i)	0	VGA 400
L	H	H	H	H	L	(i)	0	VGA 480
L	――	――	――	――	L	――	1	8514A
L	――	――	――	L	L	――	0	MAC II
L	L	L	H	H	L	(ii)	0	800＊600(1)P.P
H	――	――	――	――	H	――	0	MDA
L	――	――	H	L	L	(i)	0	PGC
H	――	――	H	L	L	――	0	TTL C.S.
H	H	L	H	H	L	――	0	TTL N.P.
H	H	H	H	H	L	――	0	TTL N.N.
L	L	L	H	H	L	(i)	0	ANALOG(1) PP
L	――	――	H	L	L	(ii)	0	ANALOG(2) CS
L	――	――	――	――	H	――	0	USER
L	L	H	H	H	L	(ii)	0	800＊600(2)
L	H	L	H	H	L	(ii)	0	800＊600(3)
L	H	H	H	H	L	(ii)	0	800＊600(4)

NOTES

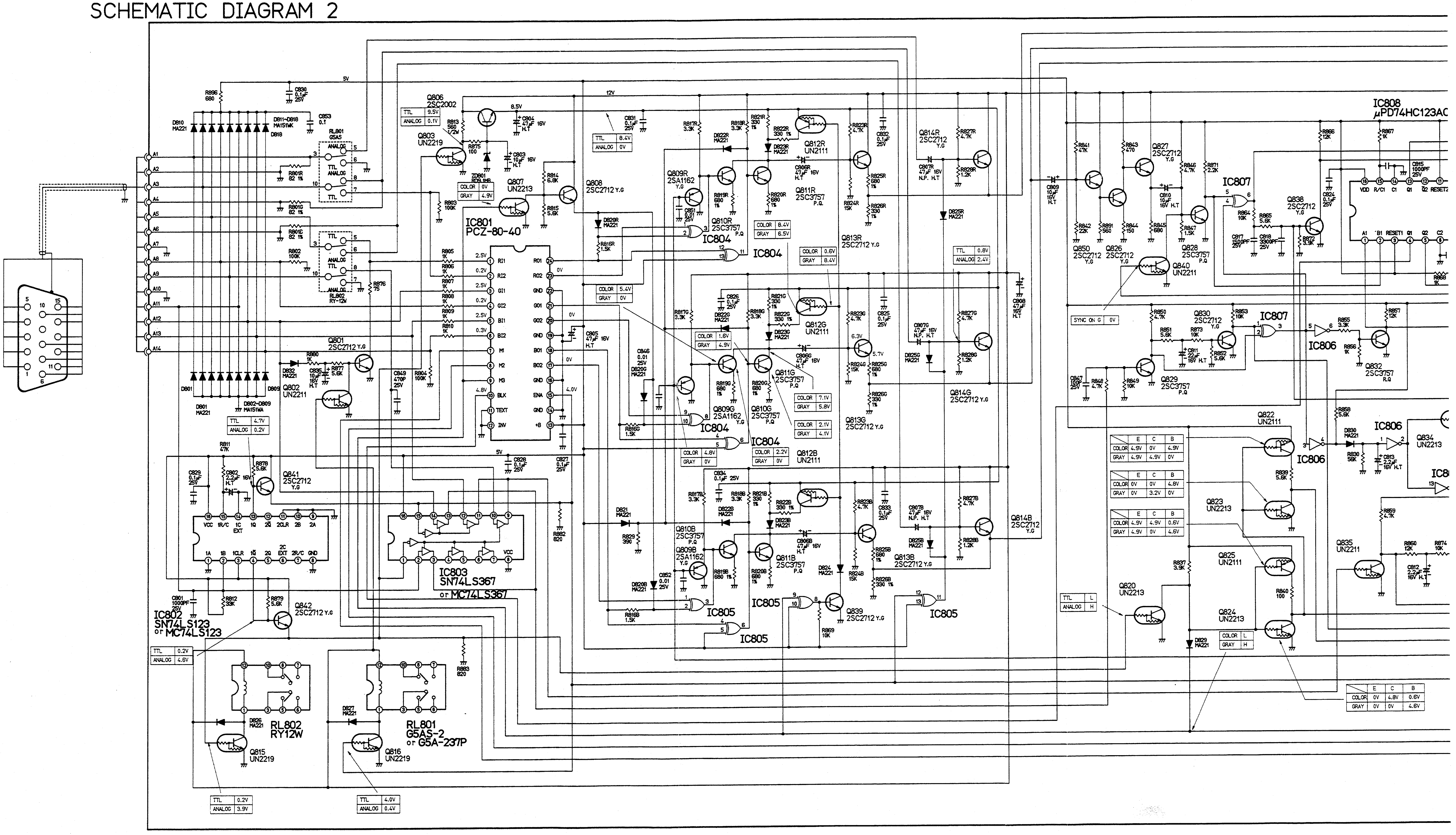
1. RESISTOR VALUES ARE IN Ω (OHM) K = 1.000Ω M = 1.000.000Ω
2. ALL RESISTORS ARE 1/6WATT EXCEPT WHERE OTHERWISE INDICATED.
3. CAPACITOR VALUES ARE IN μF UNLESS OTHERWISE INDICATED. P = PF
4. ALL CAPACITORS ARE 50VOLTS EXCEPT WHERE OTHERWISE INDICATED.
5. VOLTAGES AND WAVEFORMS ARE MEASURED UNDER THE CHARACTER SIGNALS IN THE CONDITIONS OF CONTRAST AND BRIGHTNESS CONTROLS ARE MAXIMUM AND ALL OTHER CONTROLS ARE NORMAL OPERATION.
6. Ⓗ----- HORIZONTAL RATE. Ⓥ----- VERTICAL RATE.
7. VOLTAGES AND WAVEFORMS ARE MEASURED UNDER THE FOLLOWING SYNC. AND VIDEO. EXCEPT WHERE OTHERWISE INDICATED.
   SYNC: HORIZONTAL RATE. 22KHz SEPARATE SYNC. TTL LEVEL POSITIVE
   VIDEO: TTL LEVEL POSITIVE. ALL INVERTED "H" PATTERN
8. L:TTL LOW LEVEL
   H:TTL HIGH LEVEL
9. (i):FH ≦ 33KHz
   (ii):FH > 33KHz
10. Fv 0:Fv≦ 75Hz
    1:Fv> 75Hz

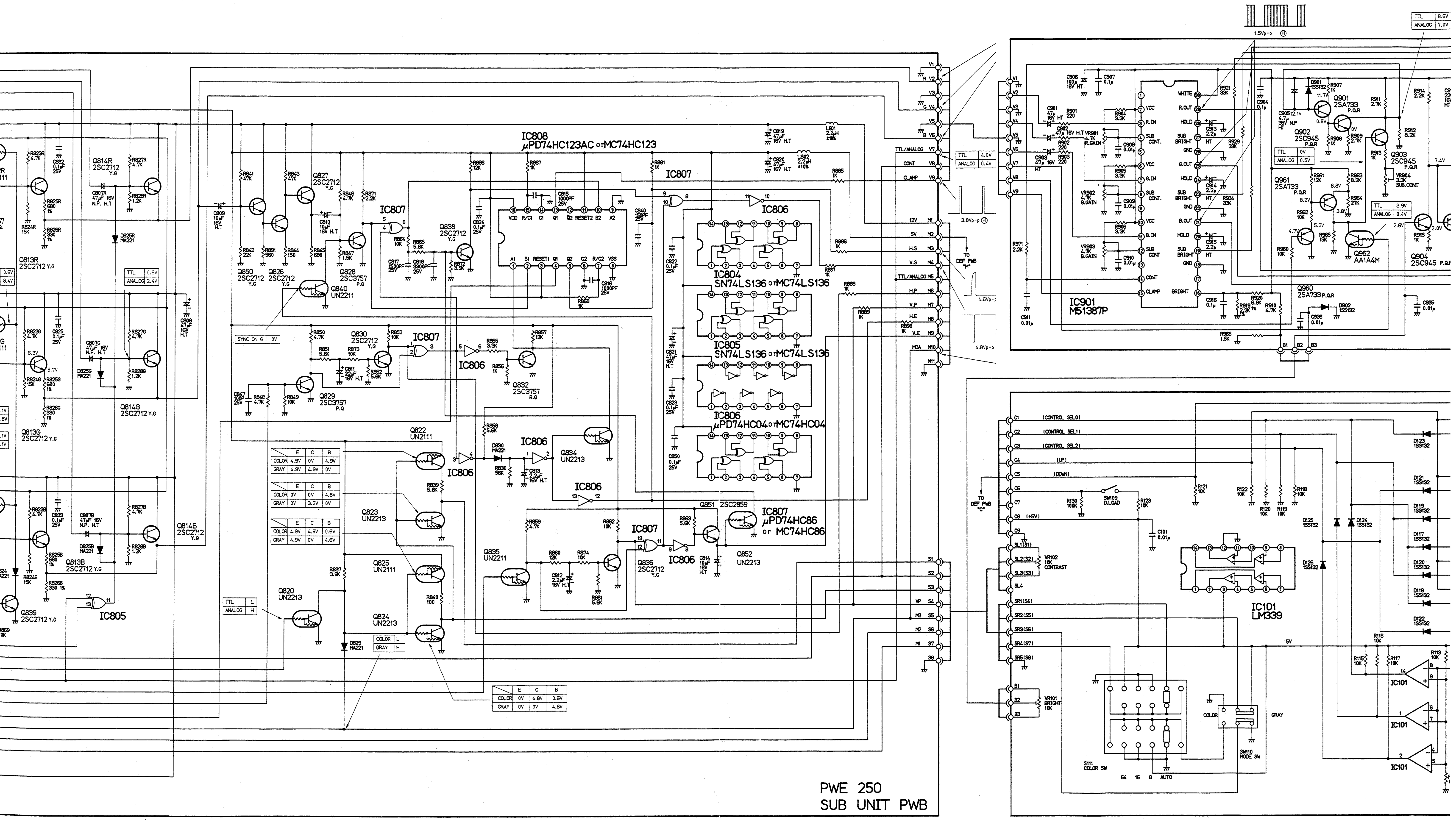
WARNING

REPLACEMENT PARTS WHICH HAVE SPECIAL SAFETY CHARACTERISTICS ARE IDENTIFIED BY ⚠ SHADING ON THE SCHEMATICS. REPLACE THESE CRITICAL COMPONENTS WITH RECOMMENDED REPLACEMENT PARTS.
DON'T DEGRADE THE SAFETY OF THE SET THROUGH IMPROPER SERVICING.
CONTROL (S) MARKED ＊ IS PERMANENTLY FROZEN.
DO NOT ATTEMPT TO DEFEAT OR IMPROPERLY REPLACE.

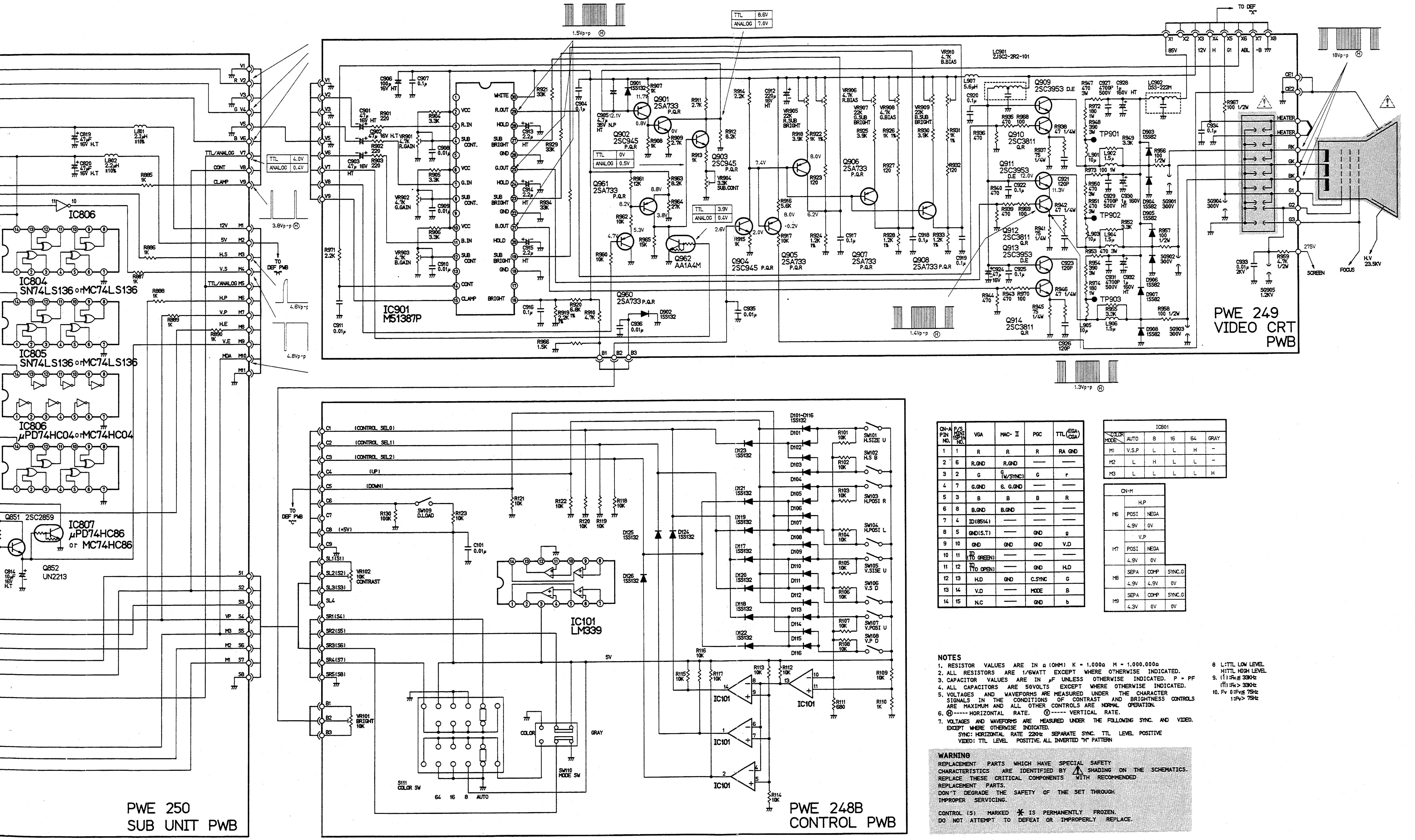
NEC JC-1404HME/EE/R

SCHEMATIC DIAGRAM 2


IC801
PCZ-80-40
IC802
SN74LS123
or MC74LS123
IC803
SN74LS367
or MC74LS367
IC804
IC805
IC806
IC807
IC808
μPD74HC123AC
RL801
G5AS-2
or G5A-237P
RL802
RY12W
Q801 2SC2712 Y.G
Q802 UN2211
Q803 UN2219
Q806 2SC2002
Q807 UN2213
Q808 2SC2712 Y.G
Q809R 2SA1162
Q810R 2SC3757
Q811R 2SC3757
Q812R UN2111
Q813R 2SC2712 Y.G
Q814R 2SC2712 Y.G
Q809G 2SA1162
Q810G 2SC3757
Q811G 2SC3757
Q812G UN2111
Q813G 2SC2712 Y.G
Q814G 2SC2712 Y.G
Q809B 2SA1162
Q810B 2SC3757
Q811B 2SC3757
Q812B UN2111
Q813B 2SC2712 Y.G
Q814B 2SC2712 Y.G
Q815 UN2219
Q816 UN2219
Q820 UN2213
Q822 UN2111
Q823 UN2213
Q824 UN2213
Q825 UN2111
Q826 2SC2712 Y.G
Q827 2SC2712 Y.G
Q828 2SC3757 P.Q
Q829 2SC3757 P.Q
Q830 2SC2712 Y.G
Q832 2SC3757 P.Q
Q834 UN2213
Q835 UN2211
Q838 2SC2712 Y.G
Q839 2SC2712 Y.G
Q840 UN2211
Q841 2SC2712 Y.G
Q842 2SC2712 Y.G
Q850 2SC2712 Y.G
5V
12V
8.5V
SYNC ON G 0V
TTL
ANALOG
COLOR
GRAY


PWE 250
SUB UNIT PWB
IC808
μPD74HC123AC or MC74HC123
IC807
μPD74HC86
or MC74HC86
IC806
μPD74HC04 or MC74HC04
IC804
SN74LS136 or MC74LS136
IC805
SN74LS136 or MC74LS136
IC901
M51387P
IC101
LM339
Q814R 2SC2712 Y.G
Q813R 2SC2712 Y.G
Q814G 2SC2712 Y.G
Q813G 2SC2712 Y.G
Q814B 2SC2712 Y.G
Q813B 2SC2712 Y.G
Q839 2SC2712 Y.G
Q827 2SC2712 Y.G
Q850 2SC2712 Y.G
Q826 2SC2712 Y.G
Q828 2SC3757 P.Q
Q838 2SC2712 Y.G
Q840 UN2211
Q830 2SC2712 Y.G
Q829 2SC3757 P.Q
Q832 2SC3757 R.Q
Q822 UN2111
Q823 UN2213
Q825 UN2111
Q824 UN2213
Q820 UN2213
Q834 UN2213
Q835 UN2211
Q836 2SC2712 Y.G
Q851 2SC2859
Q852 UN2213
Q901 2SA733 P.Q.R
Q902 2SC945 P.Q.R
Q903 2SC945 P.Q.R
Q961 2SA733 P.Q.R
Q962 AA1A4M
Q904 2SC945 P.Q.R
Q960 2SA733 P.Q.R
SYNC ON G 0V
TTL 0.8V
ANALOG 2.4V
TTL L
ANALOG H
E C B
COLOR 4.9V 0V 4.9V
GRAY 4.9V 4.9V 0V
E C B
COLOR 0V 0V 4.8V
GRAY 0V 3.2V 0V
E C B
COLOR 4.9V 4.9V 0.6V
GRAY 4.9V 0V 4.6V
COLOR L
GRAY H
E C B
COLOR 0V 4.8V 0.6V
GRAY 0V 0V 4.6V
TTL 4.0V
ANALOG 0.4V
TTL 0V
ANALOG 0.5V
TTL 3.9V
ANALOG 0.4V
TTL 8.6V
ANALOG 7.0V
1.5Vp-p H
3.8Vp-p H
4.6Vp-p
4.8Vp-p
TO DEF PWB "H"
TO DEF PWB "C"
12V
5V
H.S
V.S
TTL/ANALOG
CONT
CLAMP
H.P
V.P
H.E
V.E
HDA
(CONTROL SEL0)
(CONTROL SEL1)
(CONTROL SEL2)
(UP)
(DOWN)
(+5V)
VR102 10K CONTRAST
VR101 BRIGHT 10K
VR901 4.7K R.GAIN
VR902 4.7K G.GAIN
VR903 4.7K B.GAIN
VR904 3.3K SUB.CONT
SW109 D.LOAD
S111 COLOR SW
64 16 8 AUTO
SW110 MODE SW
COLOR
GRAY
WHITE
R.OUT
HOLD
SUB BRIGHT
GND
G.OUT
B.OUT
VCC
R.IN
G.IN
B.IN
SUB CONT.
CONT
CLAMP
BRIGHT

RUN NO.1


PWE 250
SUB UNIT PWB
PWE 248B
CONTROL PWB
PWE 249
VIDEO CRT
PWB
IC901
M51387P
IC101
LM339
IC804
SN74LS136 or MC74LS136
IC805
SN74LS136 or MC74LS136
IC806
μPD74HC04 or MC74HC04
IC807
μPD74HC86
or MC74HC86
Q851 2SC2859
Q852
UN2213
Q901 2SA733 P.Q.R
Q902 2SC945 P.Q.R
Q903 2SC945 P.Q.R
Q904 2SC945 P.Q.R
Q905 2SA733 P.Q.R
Q906 2SA733 P.Q.R
Q907 2SA733 P.Q.R
Q908 2SA733 P.Q.R
Q909 2SC3953 D.E
Q910 2SC3811 Q.R
Q911 2SC3953 D.E
Q912 2SC3811 Q.R
Q913 2SC3953 D.E
Q914 2SC3811 Q.R
Q960 2SA733 P.Q.R
Q961 2SA733 P.Q.R
Q962 AA1A4M
TO DEF "X"
TO DEF PWB "H"
TO DEF PWB "C"
S111 COLOR SW
SW110 MODE SW
COLOR
GRAY
64 16 8 AUTO
SCREEN
FOCUS
H.V 23.5KV
1.5Vp-p Ⓗ
1.4Vp-p Ⓗ
1.3Vp-p Ⓗ
18Vp-p Ⓗ
3.8Vp-p Ⓗ
4.6Vp-p
4.8Vp-p

CN-A PIN NO.	P/S MINI 15Pin NO.	VGA	MAC- II	PGC	TTL (EGA CGA)
1	1	R	R	R	RA GND
2	6	R.GND	R.GND	——	——
3	2	G	G (W/SYNC)	G	r
4	7	G.GND	6. G.GND	——	——
5	3	B	B	B	R
6	8	B.GND	B.GND	——	——
7	4	ID(8514)	——	——	——
8	5	GND(S.T)	——	GND	g
9	10	GND	GND	GND	V.D
10	11	ID (TO GREEN)	——	——	——
11	12	ID (TO OPEN)	——	GND	H.D
12	13	H.D	GND	C.SYNC	G
13	14	V.D	——	MODE	B
14	15	N.C	——	GND	b

IC801					
COLOR / MODE	AUTO	8	16	64	GRAY
M1	V.S.P	L	L	H	-
M2	L	H	L	L	-
M3	L	L	L	L	H

CN-M			
M6	H.P		
	POSI	NEGA	
	4.9V	0V	
M7	V.P		
	POSI	NEGA	
	4.9V	0V	
M8	SEPA	COMP	SYNC.G
	4.9V	4.9V	0V
M9	SEPA	COMP	SYNC.G
	4.3V	0V	0V

NOTES

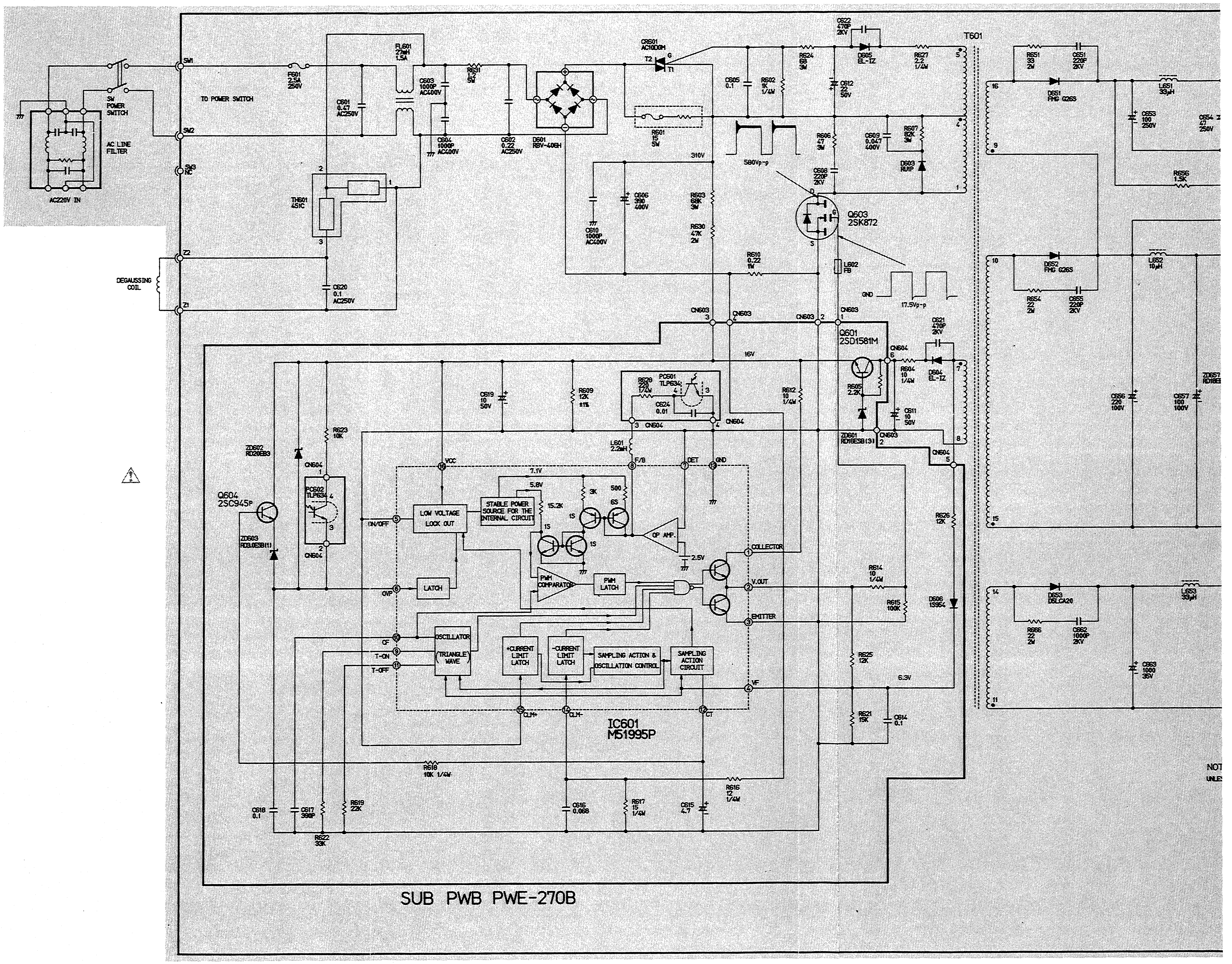
1. RESISTOR VALUES ARE IN Ω (OHM) K = 1.000Ω M = 1.000.000Ω
2. ALL RESISTORS ARE 1/6WATT EXCEPT WHERE OTHERWISE INDICATED.
3. CAPACITOR VALUES ARE IN μF UNLESS OTHERWISE INDICATED. P = PF
4. ALL CAPACITORS ARE 50VOLTS EXCEPT WHERE OTHERWISE INDICATED.
5. VOLTAGES AND WAVEFORMS ARE MEASURED UNDER THE CHARACTER SIGNALS IN THE CONDITIONS OF CONTRAST AND BRIGHTNESS CONTROLS ARE MAXIMUM AND ALL OTHER CONTROLS ARE NORMAL OPERATION.
6. Ⓗ----- HORIZONTAL RATE. Ⓥ----- VERTICAL RATE.
7. VOLTAGES AND WAVEFORMS ARE MEASURED UNDER THE FOLLOWING SYNC. AND VIDEO. EXCEPT WHERE OTHERWISE INDICATED.
   SYNC: HORIZONTAL RATE 22KHz SEPARATE SYNC. TTL LEVEL POSITIVE
   VIDEO: TTL LEVEL POSITIVE. ALL INVERTED "H" PATTERN
8. L:TTL LOW LEVEL
   H:TTL HIGH LEVEL
9. (Ⅰ):$F_H \leq$ 33KHz
   (Ⅱ):$F_H >$ 33KHz
10. Fv 0:Fv≦ 75Hz
    1:Fv> 75Hz

WARNING

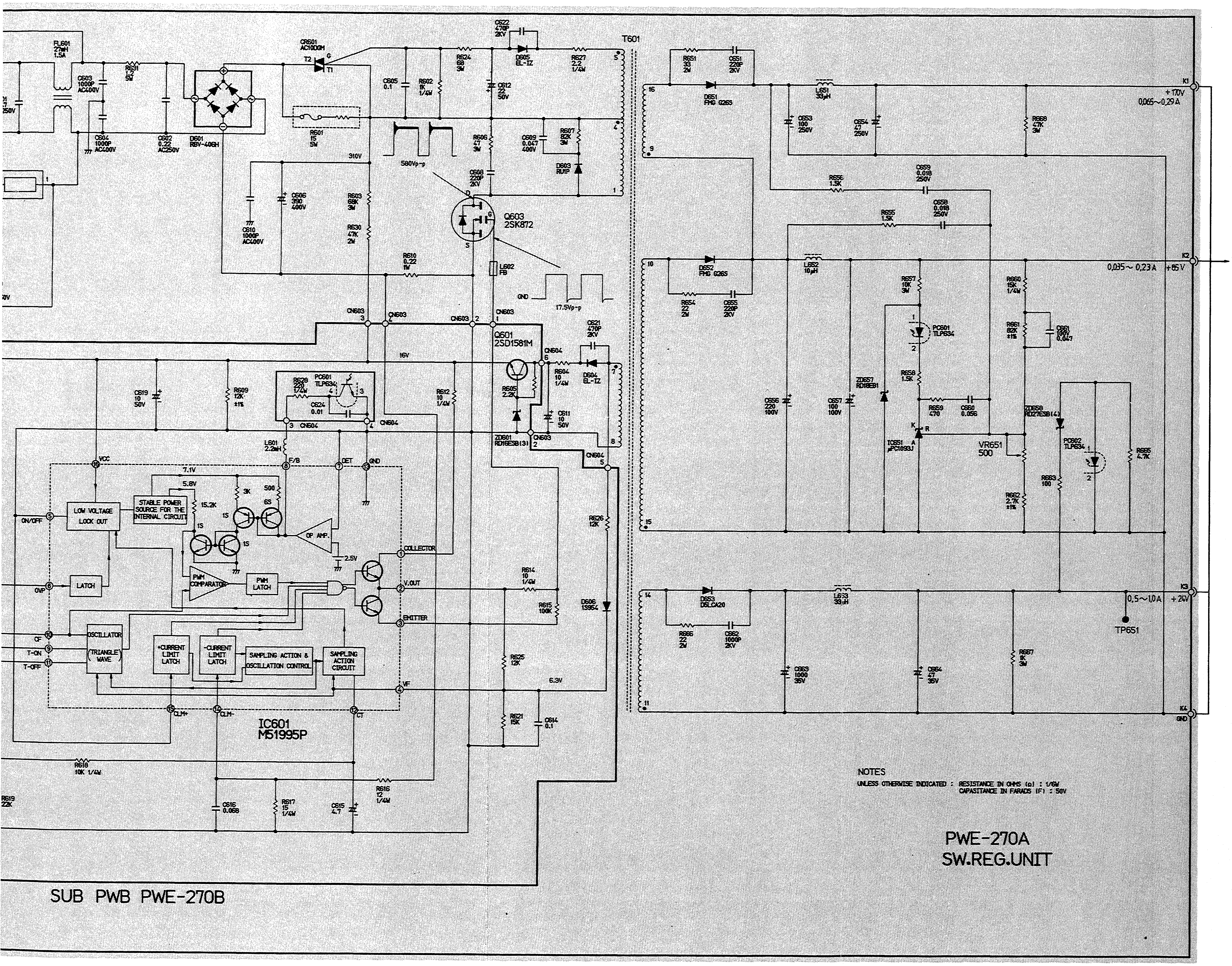
REPLACEMENT PARTS WHICH HAVE SPECIAL SAFETY CHARACTERISTICS ARE IDENTIFIED BY ⚠ SHADING ON THE SCHEMATICS. REPLACE THESE CRITICAL COMPONENTS WITH RECOMMENDED REPLACEMENT PARTS.
DON'T DEGRADE THE SAFETY OF THE SET THROUGH IMPROPER SERVICING.

CONTROL (S) MARKED ✱ IS PERMANENTLY FROZEN.
DO NOT ATTEMPT TO DEFEAT OR IMPROPERLY REPLACE.

MODEL JC-1404HMED
SCHEMATIC DIAGRAM 1

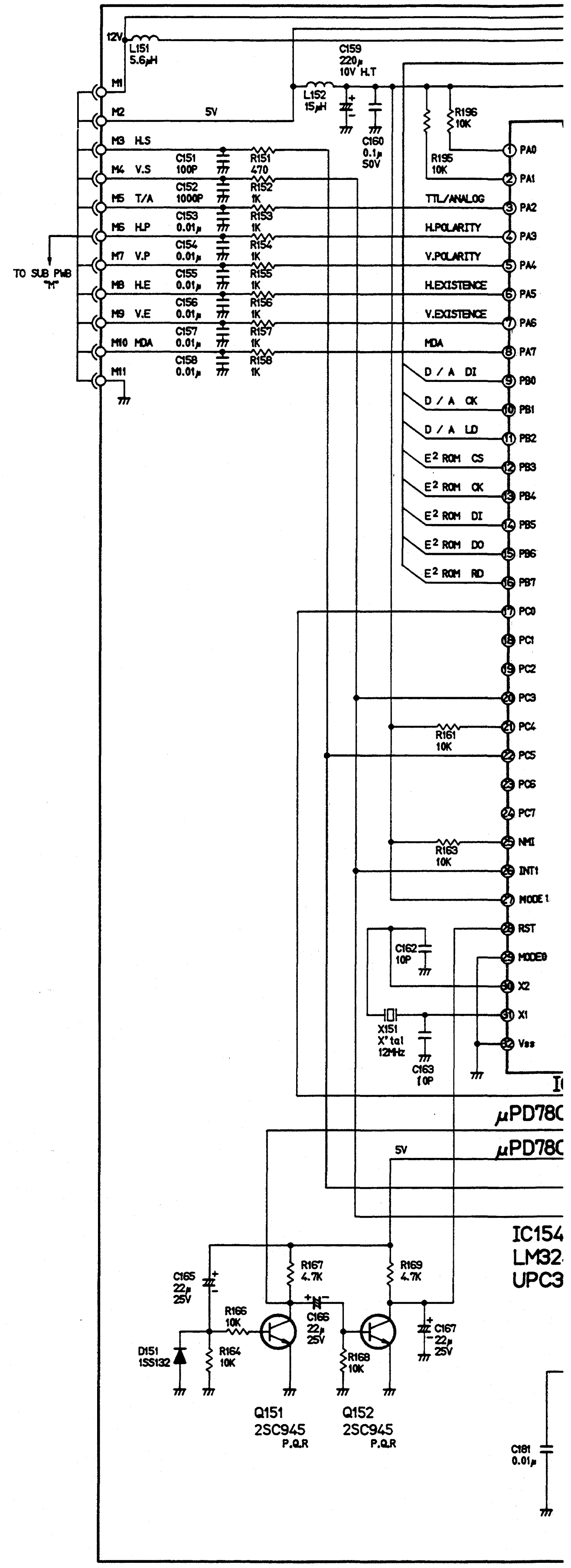

AC220V IN
AC LINE FILTER
SW POWER SWITCH
TO POWER SWITCH
SW1
SW2
SW3 NC
DEGAUSSING COIL
Z1
Z2
F601 2.5A 250V
FL601 27mH 1.5A
C601 0.47 AC250V
C603 1000P AC400V
C604 1000P AC400V
R631 4.7 5W
C602 0.22 AC250V
D601 RBV-406H
TH601 451C
C620 0.1 AC250V
CR601 AC10DGM
R601 15 5W
310V
C606 390 400V
C610 1000P AC400V
R603 68K 3W
R630 47K 2W
C605 0.1
R602 1K 1/4W
R624 68 3W
C622 470P 2KV
D605 EL-1Z
C612 22 50V
R627 2.2 1/4W
580Vp-p
R606 47 3W
C609 0.047 400V
R607 82K 3W
D603 RU1P
C608 220P 2KV
Q603 2SK872
R610 0.22 1W
L602 FB
17.5Vp-p
GND
T601
CN603
CN604
Q601 2SD1581M
R604 10 1/4W
C621 470P 2KV
D604 EL-1Z
R605 2.2K
C611 10 50V
ZD601 RD16ESB(3)
16V
R609 12K ±1%
C619 10 50V
PC601 TLP634
R629 220 1/4W
C624 0.01
R612 10 1/4W
L601 2.2mH
R623 10K
ZD602 RD20EB3
PC602 TLP634
Q604 2SC945P
ZD603 RD3.0ESB(1)
VCC
F/B
DET
GND
7.1V
5.8V
LOW VOLTAGE LOCK OUT
STABLE POWER SOURCE FOR THE INTERNAL CIRCUIT
OP AMP.
2.5V
COLLECTOR
V.OUT
EMITTER
ON/OFF
OVP
LATCH
PWM COMPARATOR
PWM LATCH
OSCILLATOR (TRIANGLE WAVE)
+CURRENT LIMIT LATCH
-CURRENT LIMIT LATCH
SAMPLING ACTION & OSCILLATION CONTROL
SAMPLING ACTION CIRCUIT
CF
T-ON
T-OFF
CLM+
CLM-
CT
VF
IC601 M51995P
R614 10 1/4W
R615 100K
D606 1SS54
R626 12K
R625 12K
6.3V
R621 15K
C614 0.1
R618 10K 1/4W
R616 12 1/4W
C618 0.1
C617 390P
R622 33K
R619 22K
C616 0.068
R617 15 1/4W
C615 4.7
SUB PWB PWE-270B
R651 33 2W
C651 220P 2KV
D651 FMG G26S
L651 33μH
C653 100 250V
C654 47 250V
R656 1.5K
D652 FMG G26S
L652 10μH
R654 22 2W
C655 220P 2KV
C656 220 100V
C657 100 100V
ZD657 RD18E
D653 D5LCA20
L653 33μH
R666 22 2W
C662 1000P 2KV
C663 1000 35V
NOT
UNLE

7816344□


FL601 27mH 1.5A
R631 4.7 5W
C603 1000P AC400V
C604 1000P AC400V
C602 0.22 AC250V
D601 RBV-406H
CR601 AC10DGM
T2 G T1
R601 15 5W
310V
C610 1000P AC400V
C606 390 400V
R603 68K 3W
R630 47K 2W
C605 0.1
R602 1K 1/4W
R624 68 3W
C622 470P 2KV
D605 EL-1Z
R627 2.2 1/4W
C612 22 50V
R606 47 3W
C609 0.047 400V
R607 82K 3W
D603 RU1P
C608 220P 2KV
580Vp-p
Q603 2SK872
R610 0.22 1W
L602 FB
GND
17.5Vp-p
T601
CN603
CN604
Q601 2SD1581M
C621 470P 2KV
R604 10 1/4W
D604 EL-1Z
R605 2.2K
ZD601 RD16ESB(3)
C611 10 50V
16V
C619 10 50V
R609 12K ±1%
R628 220 1/4W
PC601 TLP634
C624 0.01
L601 2.2mH
R612 10 1/4W
VCC F/B DET GND
7.1V
5.8V
15.2K
3K
500
6S
1S
LOW VOLTAGE LOCK OUT
STABLE POWER SOURCE FOR THE INTERNAL CIRCUIT
OP AMP.
2.5V
ON/OFF
OVP
LATCH
PWM COMPARATOR
PWM LATCH
COLLECTOR
V.OUT
EMITTER
VF
CF
T-ON
T-OFF
OSCILLATOR (TRIANGLE WAVE)
+CURRENT LIMIT LATCH
-CURRENT LIMIT LATCH
SAMPLING ACTION & OSCILLATION CONTROL
SAMPLING ACTION CIRCUIT
CLM+ CLM- CT
IC601 M51995P
R626 12K
R614 10 1/4W
R615 100K
D606 1S954
R625 12K
R621 15K
C614 0.1
6.3V
R618 10K 1/4W
R619 22K
C616 0.068
R617 15 1/4W
C615 4.7
R616 12 1/4W
R651 33 2W
C651 220P 2KV
D651 FMG G26S
L651 33μH
C653 100 250V
C654 47 250V
R668 47K 3W
K1 +170V 0.065~0.29A
R656 1.5K
C659 0.018 250V
R655 1.5K
C658 0.018 250V
D652 FMG G26S
R654 22 2W
C655 220P 2KV
L652 10μH
R657 10K 3W
R660 15K 1/4W
K2 0.035~0.23A +85V
TO DEF PWB "K"
PC651 TLP634
R661 82K ±1%
C661 100V 0.047
C656 220 100V
C657 100 100V
ZD657 RD16EB1
R658 1.5K
R659 470
C660 0.056
ZD658 RD27ESB(4)
IC651 μPC1093J
K R A
VR651 500
PC602 TLP634
R665 4.7K
R663 100
R662 2.7K ±1%
D653 D5LC20
L653 33μH
R666 22 2W
C662 1000P 2KV
C663 1000 35V
C664 47 35V
R667 1K 3W
K3 0.5~1.0A +24V
TP651
K4 GND
SUB PWB PWE-270B

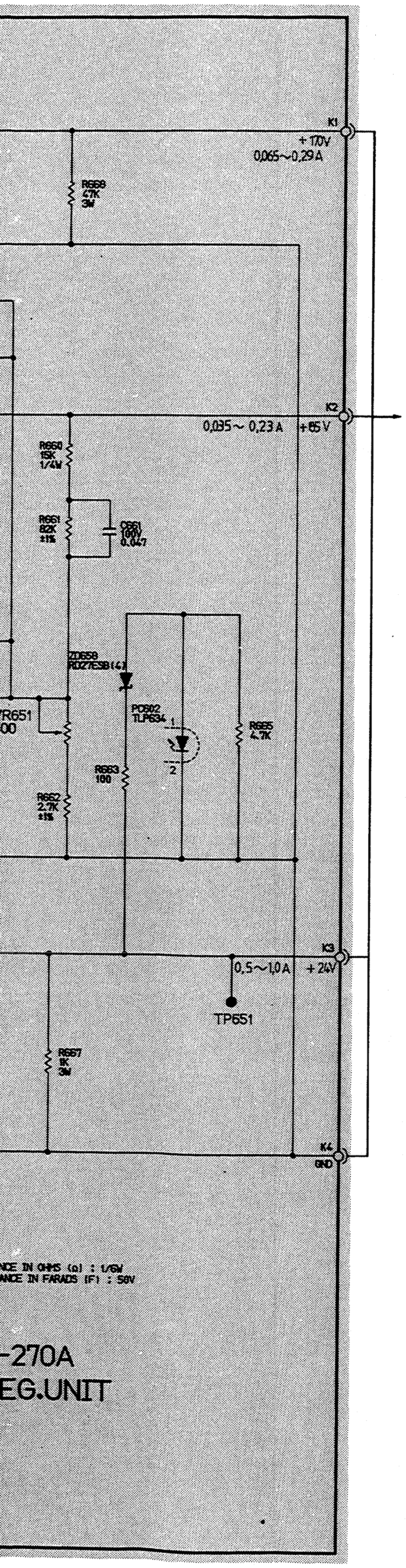
NOTES
UNLESS OTHERWISE INDICATED : RESISTANCE IN OHMS (Ω) : 1/6W
CAPASITANCE IN FARADS (F) : 50V

PWE-270A
SW.REG.UNIT


12V
L151 5.6μH
M1 M2 5V
L152 15μH
C159 220μ 10V H.T
C160 0.1μ 50V
R196 10K
R195 10K
M3 H.S
M4 V.S
M5 T/A
M6 H.P
M7 V.P
M8 H.E
M9 V.E
M10 MDA
M11
TO SUB PWB "H"
C151 100P
C152 1000P
C153 0.01μ
C154 0.01μ
C155 0.01μ
C156 0.01μ
C157 0.01μ
C158 0.01μ
R151 470
R152 1K
R153 1K
R154 1K
R155 1K
R156 1K
R157 1K
R158 1K
TTL/ANALOG
H.POLARITY
V.POLARITY
H.EXISTENCE
V.EXISTENCE
MDA
D / A DI
D / A CK
D / A LD
E² ROM CS
E² ROM CK
E² ROM DI
E² ROM DO
E² ROM RD
PA0 PA1 PA2 PA3 PA4 PA5 PA6 PA7
PB0 PB1 PB2 PB3 PB4 PB5 PB6 PB7
PC0 PC1 PC2 PC3 PC4 PC5 PC6 PC7
NMI INT1 MODE1 RST MODE0 X2 X1 Vss
R161 10K
R163 10K
C162 10P
X151 X'tal 12MHz
C163 10P
μPD780
μPD780
IC154
LM32
UPC3
5V
C165 22μ 25V
R167 4.7K
R169 4.7K
C166 22μ 25V
C167 22μ 25V
R166 10K
R164 10K
R168 10K
D151 1SS132
Q151 2SC945 P.Q.R
Q152 2SC945 P.Q.R
C181 0.01μ

1

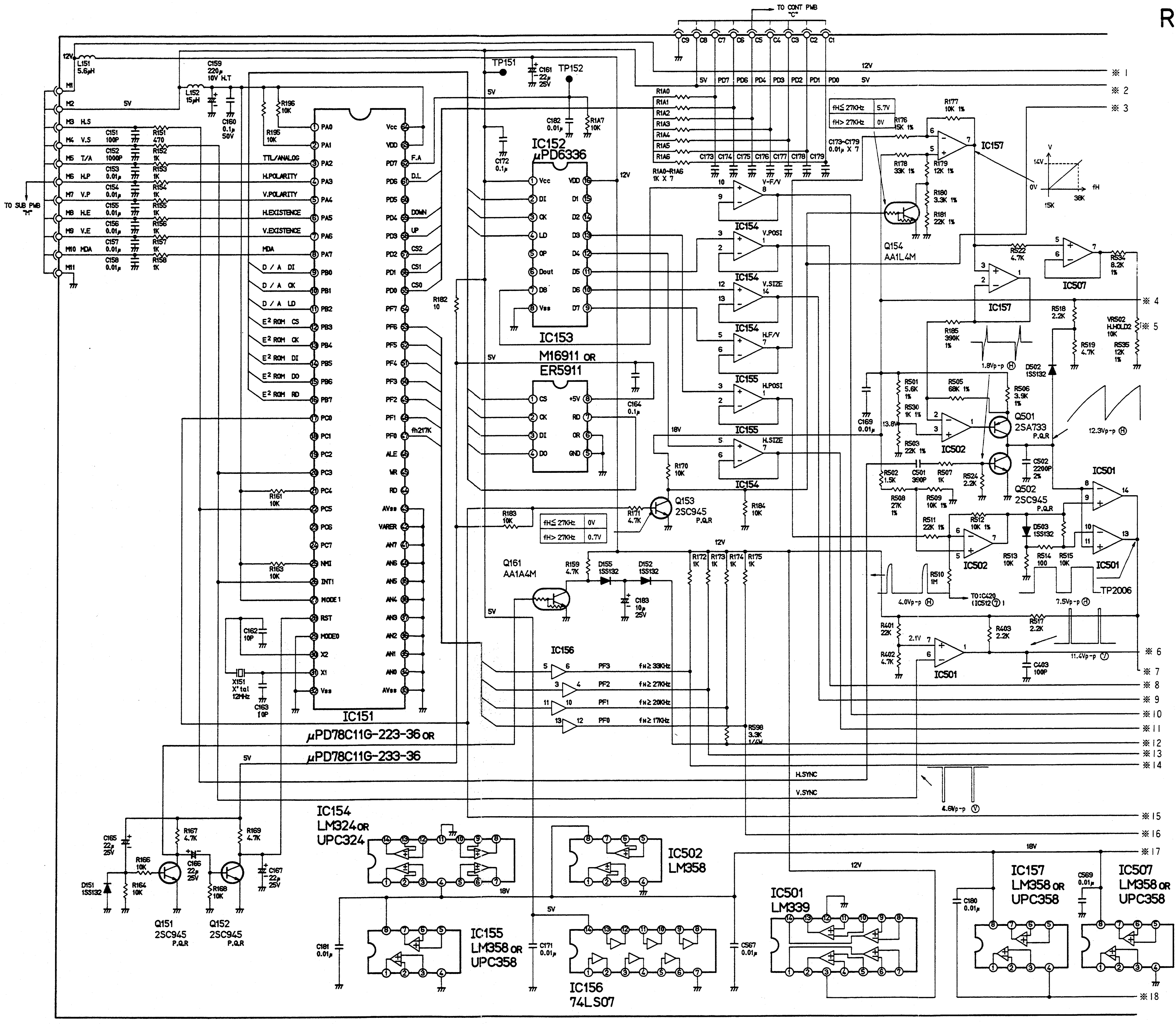
RUN NO.1



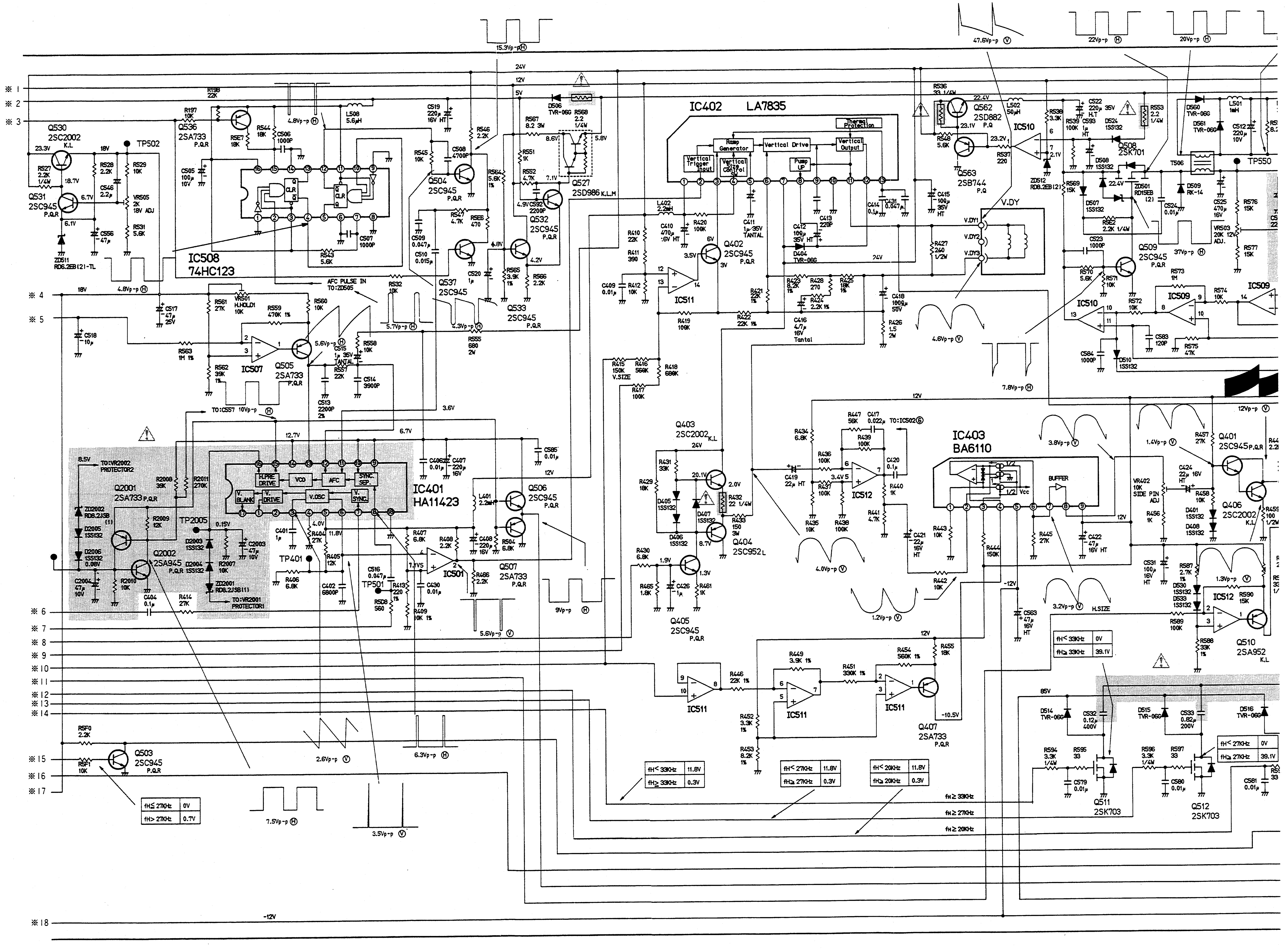
K1
+170V
0.065~0.29A
R668 47K 3W
K2
0.035~0.23A
+65V
TO DEF PWB "K"
R660 15K 1/4W
R661 82K ±1%
C661 100V 0.047
ZD658 RD27ESB(4)
PC602 TLP634
R665 4.7K
R663 100
R662 2.7K ±1%
K3
0.5~1.0A
+24V
TP651
R667 1K 3W
K4
GND

NCE IN OHMS (Ω) : 1/6W
ANCE IN FARADS (F) : 50V

-270A
EG.UNIT



TO CONT PWB "C"
C9 C8 C7 C6 C5 C4 C3 C2 C1
12V
5V PD7 PD6 PD5 PD4 PD3 PD2 PD1 PD0 5V
※1
※2
※3
※4
※5
※6
※7
※8
※9
※10
※11
※12
※13
※14
※15
※16
※17
※18
TO SUB PWB "H"
M1 M2 M3 H.S M4 V.S M5 T/A M6 H.P M7 V.P M8 H.E M9 V.E M10 MDA M11
L151 5.6μH
L152 15μH
C159 220μ 10V H.T
C160 0.1μ 50V
C151 100P
C152 1000P
C153 0.01μ
C154 0.01μ
C155 0.01μ
C156 0.01μ
C157 0.01μ
C158 0.01μ
R151 470
R152 1K
R153 1K
R154 1K
R155 1K
R156 1K
R157 1K
R158 1K
R195 10K
R196 10K
TTL/ANALOG
H.POLARITY
V.POLARITY
H.EXISTENCE
V.EXISTENCE
MDA
D/A DI
D/A CK
D/A LD
E² ROM CS
E² ROM CK
E² ROM DI
E² ROM DO
E² ROM RD
PA0 PA1 PA2 PA3 PA4 PA5 PA6 PA7
PB0 PB1 PB2 PB3 PB4 PB5 PB6 PB7
PC0 PC1 PC2 PC3 PC4 PC5 PC6 PC7
NMI INT1 MODE1 RST MODE0 X2 X1 Vss
Vcc VDD PD7 PD6 PD5 PD4 PD3 PD2 PD1 PD0
PF7 PF6 PF5 PF4 PF3 PF2 PF1 PF0
ALE WR RD AVss VAREF AN7 AN6 AN5 AN4 AN3 AN2 AN1 AN0 AVss
F.A D.L DOWN UP CS2 CS1 CS0 fh≥17K
R161 10K
R163 10K
C162 10P
X151 X'tal 12MHz
C163 10P
IC151
μPD78C11G-223-36 OR
μPD78C11G-233-36
TP151
TP152
C161 22μ 25V
C182 0.01μ
R1A7 10K
C172 0.1μ
IC152
μPD6336
Vcc DI CK LD OP Dout DB Vss VDD D1 D2 D3 D4 D5 D6 D7
IC153
M16911 OR
ER5911
CS CK DI DO +5V RD OR GND
C164 0.1μ
R182 10
R1A0 R1A1 R1A2 R1A3 R1A4 R1A5 R1A6
R1A0~R1A6 1K X 7
C173 C174 C175 C176 C177 C178 C179
C173~C179 0.01μ X 7
V-F/V
IC154 V.POSI
IC154 V.SIZE
IC154 H.F/V
IC155 H.POSI
IC155 H.SIZE
IC154
18V
R170 10K
R183 10K
R171 4.7K
Q153 2SC945 P.Q.R
R184 10K
fH≤27KHz 0V
fH>27KHz 0.7V
fH≤27KHz 5.7V
fH>27KHz 0V
R176 15K 1%
R177 10K 1%
IC157
R178 33K 1%
R179 12K 1%
R180 3.3K 1%
R181 22K 1%
Q154 AA1L4M
V
14V
0V
15K
38K
fH
R522 4.7K
IC507
R534 8.2K 1%
R518 2.2K
R519 4.7K
VR502 H.HOLD2 10K
R535 12K 1%
R185 390K 1%
1.8Vp-p Ⓗ
D502 1SS132
R501 5.6K 1%
R505 68K 1%
R506 3.9K 1%
R530 1K 1%
C169 0.01μ
13.6V
Q501 2SA733 P.Q.R
12.3Vp-p Ⓗ
IC502
R503 22K 1%
C501 390P
R507 1K
R502 1.5K
R524 2.2K
C502 2200P 2%
Q502 2SC945 P.Q.R
IC501
R508 27K 1%
R509 10K 1%
R511 22K 1%
R512 10K 1%
D503 1SS132
R513 10K
R514 100
R515 10K
R510 1M
TO:C420 (IC512⑦)
4.0Vp-p Ⓗ
7.5Vp-p Ⓗ
TP2006
12V
Q161 AA1A4M
R159 4.7K
D155 1SS132
D152 1SS132
C183 10μ 25V
R172 1K
R173 1K
R174 1K
R175 1K
R401 22K
R402 4.7K
2.1V
R403 2.2K
R517 2.2K
C403 100P
11.4Vp-p Ⓥ
IC156
PF3 fH≥33KHz
PF2 fH≥27KHz
PF1 fH≥20KHz
PF0 fH≥17KHz
R598 3.3K 1/4W
H.SYNC
V.SYNC
4.6Vp-p Ⓥ
5V
C165 22μ 25V
R167 4.7K
R169 4.7K
R166 10K
R164 10K
C166 22μ 25V
R168 10K
C167 22μ 25V
D151 1SS132
Q151 2SC945 P.Q.R
Q152 2SC945 P.Q.R
IC154
LM324 OR
UPC324
IC502
LM358
IC155
LM358 OR
UPC358
IC156
74LS07
IC501
LM339
IC157
LM358 OR
UPC358
IC507
LM358 OR
UPC358
C181 0.01μ
C171 0.01μ
C567 0.01μ
C180 0.01μ
C569 0.01μ


IC402 LA7835
Ramp Generator
Vertical Drive
Vertical Output
Thermal Protection
Vertical Trigger Input
Vertical Size Control
Pump UP
IC508 74HC123
IC401 HA11423
H.PRE DRIVE
VCO
AFC
SYNC. SEP.
V. BLANK
V. DRIVE
V.OSC
V. SYNC.
IC403 BA6110
BUFFER
IC507
IC501
IC509
IC510
IC511
IC512
Q530 2SC2002 K.L
Q531 2SC945 P.Q.R
Q536 2SA733 P.Q.R
Q504 2SC945 P.Q.R
Q537 2SC945
Q532 2SC945 P.Q.R
Q533 2SC945 P.Q.R
Q527 2SD986 K.L.M
Q505 2SA733 P.Q.R
Q506 2SC945 P.Q.R
Q507 2SA733 P.Q.R
Q2001 2SA733 P.Q.R
Q2002 2SA945 P.Q.R
Q402 2SC945 P.Q.R
Q403 2SC2002 K.L
Q404 2SC952 L
Q405 2SC945 P.Q.R
Q407 2SA733 P.Q.R
Q503 2SC945 P.Q.R
Q562 2SD882 P.Q
Q563 2SB744 P.Q
Q508 2SK701
Q509 2SC945 P.Q.R
Q401 2SC945 P.Q.R
Q406 2SC2002 K.L
Q510 2SA952 K.L
Q511 2SK703
Q512 2SK703
V.DY
V.DY1
V.DY2
V.DY3
TP502
TP2005
TP401
TP501
TP550
T506
AFC PULSE IN TO:ZD505
TO:C557
TO:VR2002 PROTECTOR2
TO:VR2001 PROTECTOR1
TO:IC502⑥
VR501 H.HOLD1 10K
VR505 2K 18V ADJ
VR402 10K SIDE PIN ADJ
VR503 20K ADJ.
R415 150K V.SIZE
H.SIZE
15.3Vp-p Ⓗ
4.8Vp-p Ⓗ
5.7Vp-p Ⓗ
4.3Vp-p Ⓥ
5.6Vp-p Ⓗ
10Vp-p Ⓗ
9Vp-p Ⓗ
5.6Vp-p Ⓥ
2.6Vp-p Ⓥ
6.3Vp-p Ⓗ
7.5Vp-p Ⓗ
3.5Vp-p Ⓥ
47.6Vp-p Ⓥ
22Vp-p Ⓗ
20Vp-p Ⓗ
37Vp-p Ⓗ
4.6Vp-p Ⓥ
7.8Vp-p Ⓗ
3.8Vp-p Ⓥ
1.4Vp-p Ⓥ
4.0Vp-p Ⓥ
1.2Vp-p Ⓥ
3.2Vp-p Ⓥ
1.3Vp-p Ⓥ
12Vp-p Ⓥ
24V
12V
5V
18V
-12V
85V
fH≦ 27KHz 0V
fH> 27KHz 0.7V
fH< 33KHz 11.8V
fH≧ 33KHz 0.3V
fH< 27KHz 11.8V
fH≧ 27KHz 0.3V
fH< 20KHz 11.8V
fH≧ 20KHz 0.3V
fH< 33KHz 0V
fH≧ 33KHz 39.1V
fH< 27KHz 0V
fH≧ 27KHz 39.1V
fH≧ 33KHz
fH≧ 27KHz
fH≧ 20KHz
※1
※2
※3
※4
※5
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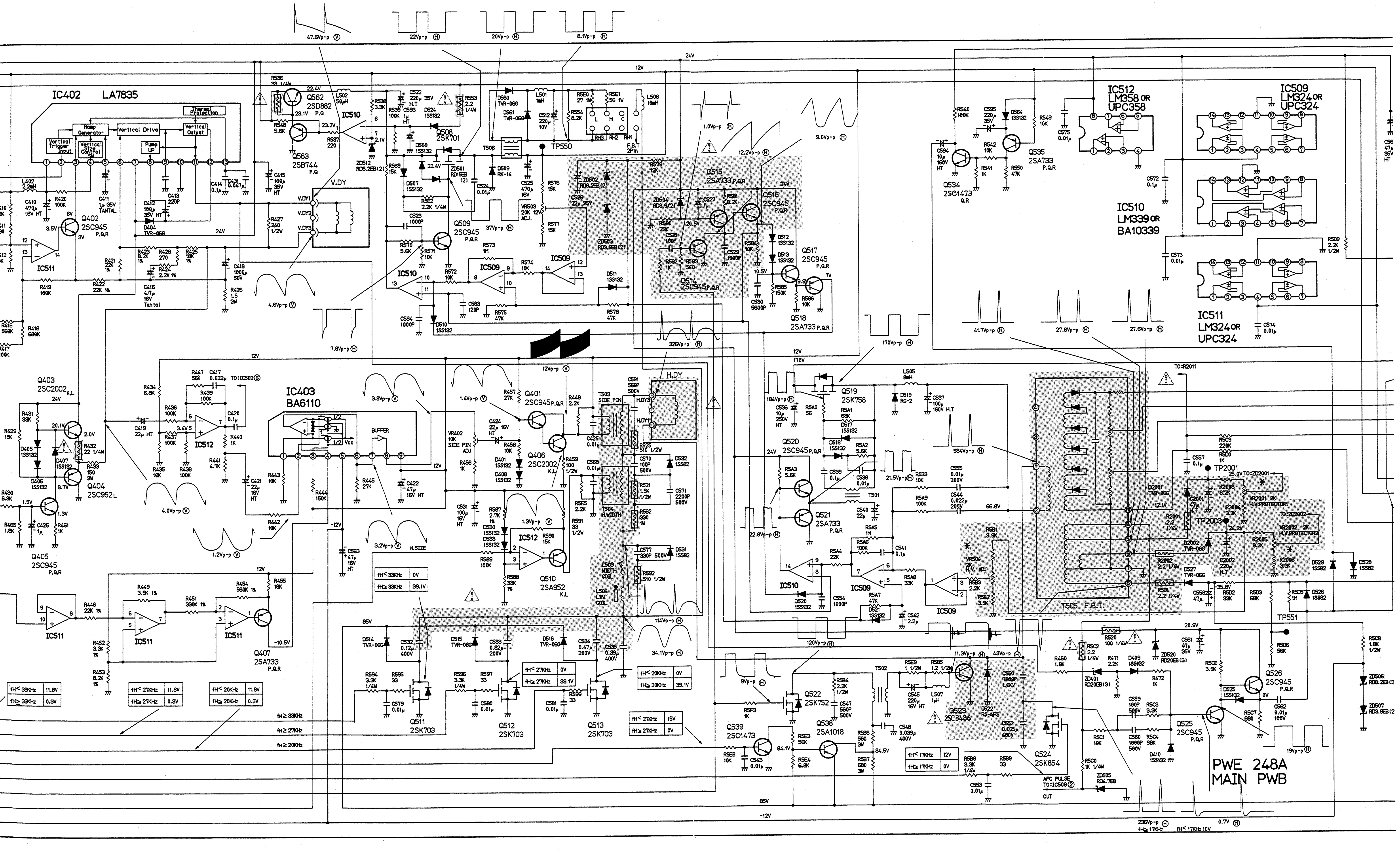
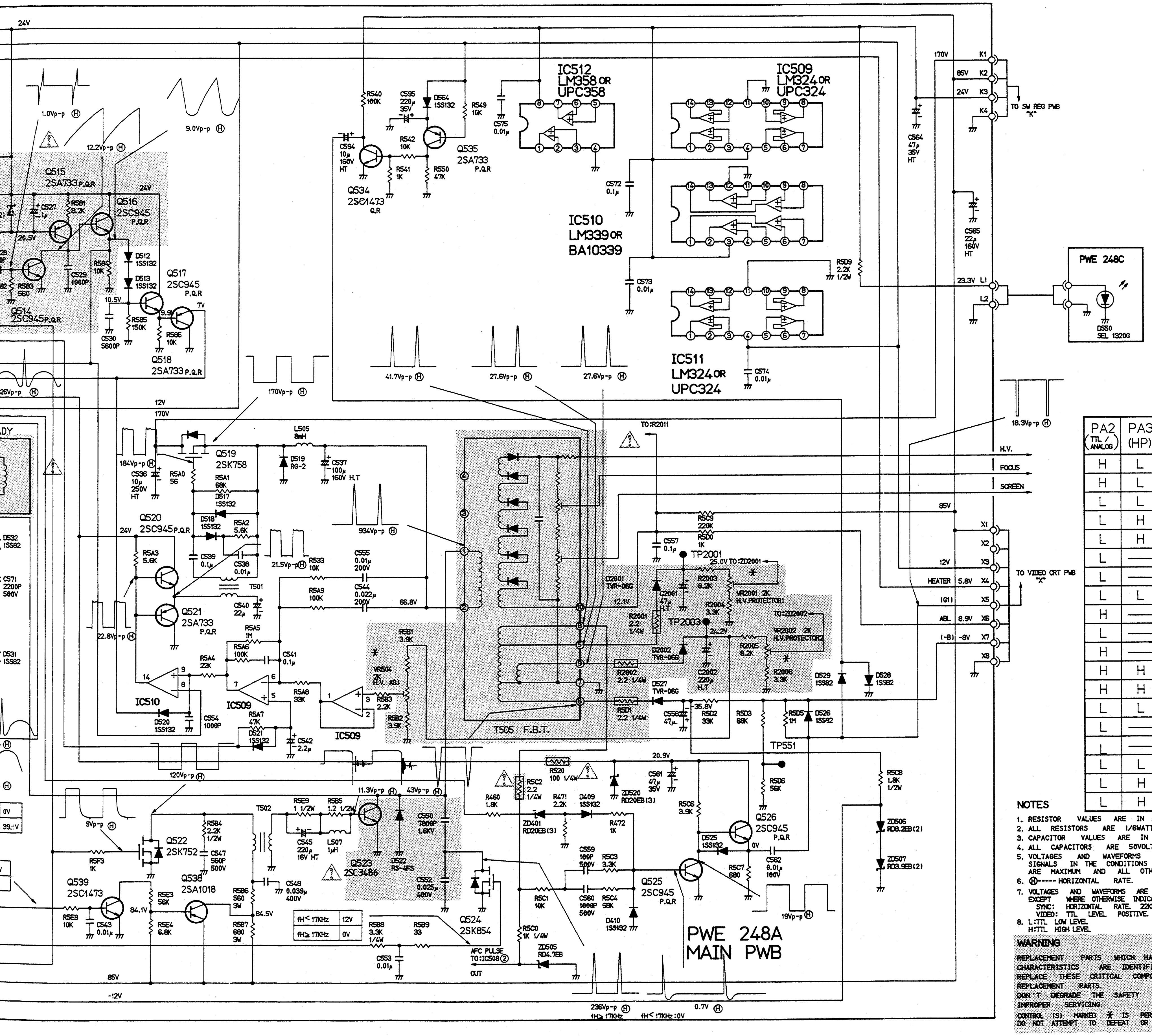
※17
※18

3



IC402 LA7835
Thermal Protection
Ramp Generator
Vertical Drive
Vertical Output
Vertical Trigger Input
Vertical Size Control SW
Pump UP
V.DY
IC403 BA6110
BUFFER
IC510
IC509
IC511
IC512
IC512 LM358 OR UPC358
IC509 LM324 OR UPC324
IC510 LM339 OR BA10339
IC511 LM324 OR UPC324
Q402 2SC945 P.Q.R
Q403 2SC2002 K.L
Q404 2SC952 L
Q405 2SC945 P.Q.R
Q401 2SC945 P.Q.R
Q406 2SC2002 K.L
Q407 2SA733 P.Q.R
Q510 2SA952 K.L
Q511 2SK703
Q512 2SK703
Q513 2SK703
Q562 2SD882 P.Q
Q563 2SB744 P.Q
Q508 2SK701
Q509 2SC945 P.Q.R
Q514 2SC945 P.Q.R
Q515 2SA733 P.Q.R
Q516 2SC945 P.Q.R
Q517 2SC945 P.Q.R
Q518 2SA733 P.Q.R
Q519 2SK758
Q520 2SC945 P.Q.R
Q521 2SA733 P.Q.R
Q522 2SK752
Q523 2SC3486
Q524 2SK854
Q525 2SC945 P.Q.R
Q526 2SC945 P.Q.R
Q534 2SC1473 Q.R
Q535 2SA733 P.Q.R
Q538 2SA1018
Q539 2SC1473
T503 SIDE PIN
T504 H.WIDTH
L503 WIDTH COIL
L504 LIN COIL
H.DY
T505 F.B.T.
T506
T501
T502
TP550
TP551
TP2001
TP2003
VR402 10K SIDE PIN ADJ
VR503 20K V.ADJ.
VR504 2K H.V. ADJ
VR2001 2K H.V.PROTECTOR1
VR2002 2K H.V.PROTECTOR2
TO:IC502⑥
TO:R2011
TO:ZD2001
TO:ZD2002
AFC PULSE TO:IC508② OUT
H.SIZE
47.6Vp-p Ⓥ
22Vp-p Ⓗ
20Vp-p Ⓗ
8.1Vp-p Ⓗ
1.0Vp-p Ⓗ
12.2Vp-p Ⓗ
9.0Vp-p Ⓗ
4.6Vp-p Ⓥ
7.8Vp-p Ⓗ
326Vp-p Ⓗ
170Vp-p Ⓗ
41.7Vp-p Ⓗ
27.6Vp-p Ⓗ
27.6Vp-p Ⓗ
3.8Vp-p Ⓥ
1.4Vp-p Ⓥ
12Vp-p Ⓥ
4.0Vp-p Ⓥ
1.2Vp-p Ⓥ
3.2Vp-p Ⓗ
1.3Vp-p Ⓥ
184Vp-p Ⓗ
934Vp-p Ⓗ
21.5Vp-p Ⓗ
22.8Vp-p Ⓗ
114Vp-p Ⓗ
34.1Vp-p Ⓗ
120Vp-p Ⓗ
9Vp-p Ⓗ
11.3Vp-p Ⓗ
43Vp-p Ⓗ
19Vp-p Ⓗ
236Vp-p Ⓗ fH≥ 17KHz fH< 17KHz:0V
0.7V Ⓗ
fH< 33KHz 11.8V
fH≥ 33KHz 0.3V
fH< 27KHz 11.8V
fH≥ 27KHz 0.3V
fH< 20KHz 11.8V
fH≥ 20KHz 0.3V
fH< 33KHz 0V
fH≥ 33KHz 39.1V
fH< 27KHz 0V
fH≥ 27KHz 39.1V
fH< 20KHz 0V
fH≥ 20KHz 39.1V
fH< 27KHz 15V
fH≥ 27KHz 0V
fH< 17KHz 12V
fH≥ 17KHz 0V
fH≥ 33KHz
fH≥ 27KHz
fH≥ 20KHz
24V
12V
85V
-12V
170V
PWE 248A MAIN PWB


IC512
LM358 OR
UPC358
IC509
LM324 OR
UPC324
IC510
LM339 OR
BA10339
IC511
LM324 OR
UPC324
Q515
2SA733 P.Q.R
Q516
2SC945 P.Q.R
Q517
2SC945 P.Q.R
Q514
2SC945 P.Q.R
Q518
2SA733 P.Q.R
Q534
2SC1473 Q.R
Q535
2SA733 P.Q.R
Q519
2SK758
Q520
2SC945 P.Q.R
Q521
2SA733 P.Q.R
Q522
2SK752
Q523
2SC3486
Q524
2SK854
Q525
2SC945 P.Q.R
Q526
2SC945 P.Q.R
Q538
2SA1018
Q539
2SC1473
T505 F.B.T.
PWE 248C
D550 SEL 1320G
TO SW REG PWB "K"
TO VIDEO CRT PWB "X"
H.V.
FOCUS
SCREEN
HEATER
ABL
AFC PULSE TO:IC508②
TP2001
TP2003
TP551
VR2001 2K H.V.PROTECTOR1
VR2002 2K H.V.PROTECTOR2
VR504 2K H.V. ADJ
fH< 17KHz 12V
fH≧ 17KHz 0V
PWE 248A
MAIN PWB

PD0 (CS0)	PD1 (CS1)	PD2 (CS2)	
L	H	H	H.POSI
H	L	L	H.SIZE
H	L	H	V.POSI
H	H	L	V.SIZE
H	H	H	DISABLE

PD3	PD4	
H	L	UP
L	H	DOWN
H	H	DISABLE

PD6	PD7	
L	L	USER CONTROL MODE
L	H	FACTORY ADJ. MODE
H	L	DATA LOAD
H	H	FACTORY DATA WRITING

PA2 (TTL / ANALOG)	PA3 (HP)	PA4 (VP)	PA5 (HE)	PA6 (VE)	PA7 (MODE)	FH	FV	
H	L	L	H	H	L	—	0	CGA
H	L	H	H	H	L	—	0	EGA
L	L	H	H	H	L	(i)	0	VGA 350
L	H	L	H	H	L	(i)	0	VGA 400
L	H	H	H	H	L	(i)	0	VGA 480
L	—	—	—	—	L	—	1	8514A
L	—	—	—	L	L	—	0	MAC II
L	L	L	H	H	L	(ii)	0	800 ✳ 600(1)P.P
H	—	—	—	—	H	—	0	MDA
L	—	—	H	L	L	(i)	0	PGC
H	—	—	H	L	L	—	0	TTL C.S.
H	H	L	H	H	L	—	0	TTL N.P.
H	H	H	H	H	L	—	0	TTL N.N.
L	L	L	H	H	L	(i)	0	ANALOG(1) PP
L	—	—	H	L	L	(ii)	0	ANALOG(2) CS
L	—	—	—	—	H	—	0	USER
L	L	H	H	H	L	(ii)	0	800 ✳ 600(2)
L	H	L	H	H	L	(ii)	0	800 ✳ 600(3)
L	H	H	H	H	L	(ii)	0	800 ✳ 600(4)

NOTES

1. RESISTOR VALUES ARE IN Ω (OHM) K = 1,000Ω M = 1,000,000Ω
2. ALL RESISTORS ARE 1/6WATT EXCEPT WHERE OTHERWISE INDICATED.
3. CAPACITOR VALUES ARE IN μF UNLESS OTHERWISE INDICATED. P = PF
4. ALL CAPACITORS ARE 50VOLTS EXCEPT WHERE OTHERWISE INDICATED.
5. VOLTAGES AND WAVEFORMS ARE MEASURED UNDER THE CHARACTER SIGNALS IN THE CONDITIONS OF CONTRAST AND BRIGHTNESS CONTROLS ARE MAXIMUM AND ALL OTHER CONTROLS ARE NORMAL OPERATION.
6. Ⓗ----- HORIZONTAL RATE. Ⓥ----- VERTICAL RATE.
7. VOLTAGES AND WAVEFORMS ARE MEASURED UNDER THE FOLLOWING SYNC. AND VIDEO. EXCEPT WHERE OTHERWISE INDICATED.
   SYNC: HORIZONTAL RATE. 22KHz SEPARATE SYNC. TTL LEVEL POSITIVE
   VIDEO: TTL LEVEL POSITIVE. ALL INVERTED "H" PATTERN
8. L:TTL LOW LEVEL
   H:TTL HIGH LEVEL
9. (i):FH ≦ 33KHz
   (ii):FH > 33KHz
10. Fv 0:Fv≦ 75Hz
    1:Fv> 75Hz

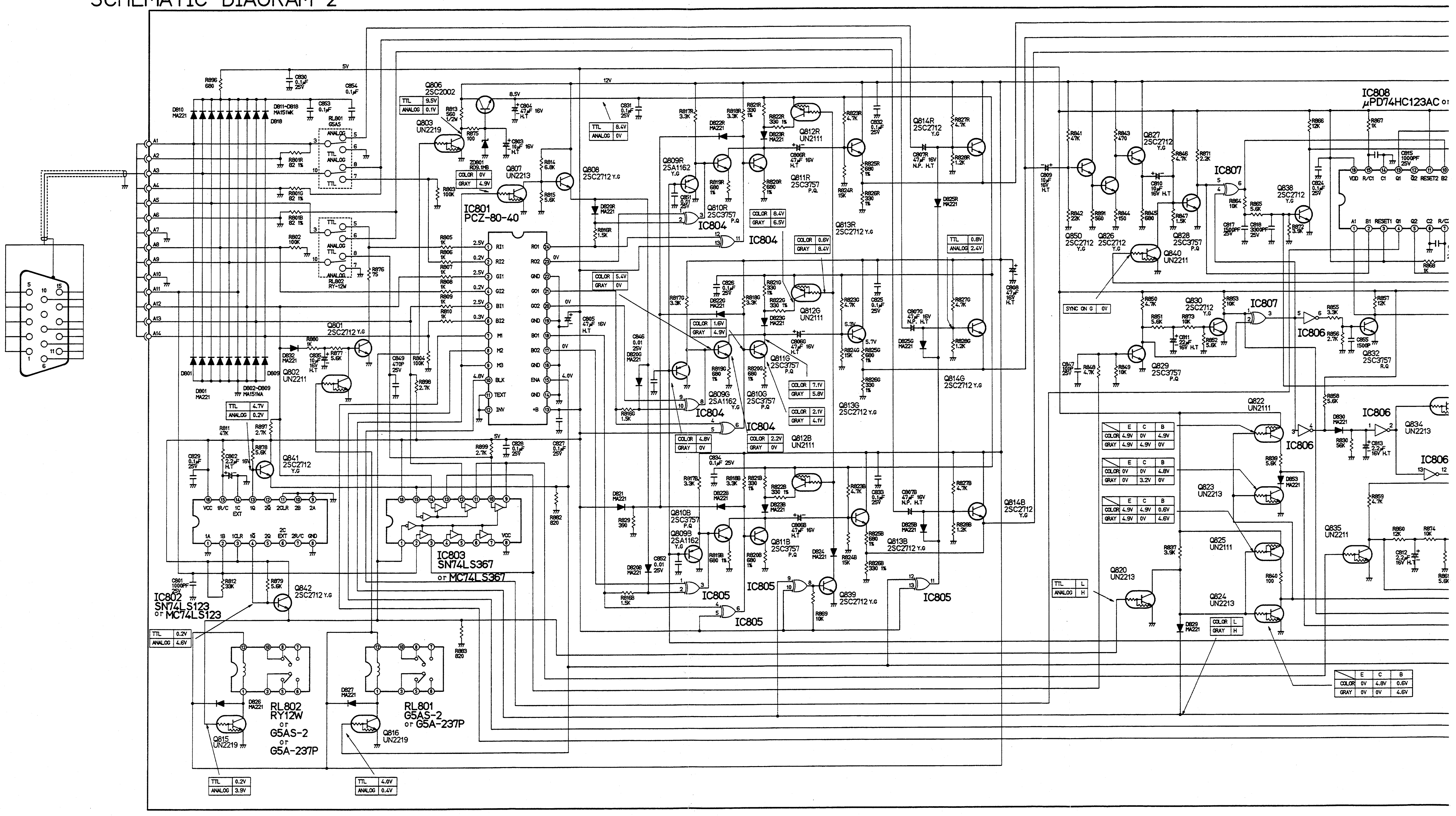
WARNING

REPLACEMENT PARTS WHICH HAVE SPECIAL SAFETY CHARACTERISTICS ARE IDENTIFIED BY ⚠ SHADING ON THE SCHEMATICS. REPLACE THESE CRITICAL COMPONENTS WITH RECOMMENDED REPLACEMENT PARTS.
DON'T DEGRADE THE SAFETY OF THE SET THROUGH IMPROPER SERVICING.

CONTROL (S) MARKED ✳ IS PERMANENTLY FROZEN.
DO NOT ATTEMPT TO DEFEAT OR IMPROPERLY REPLACE.

NEC

JC-1404HMED
SCHEMATIC DIAGRAM 2

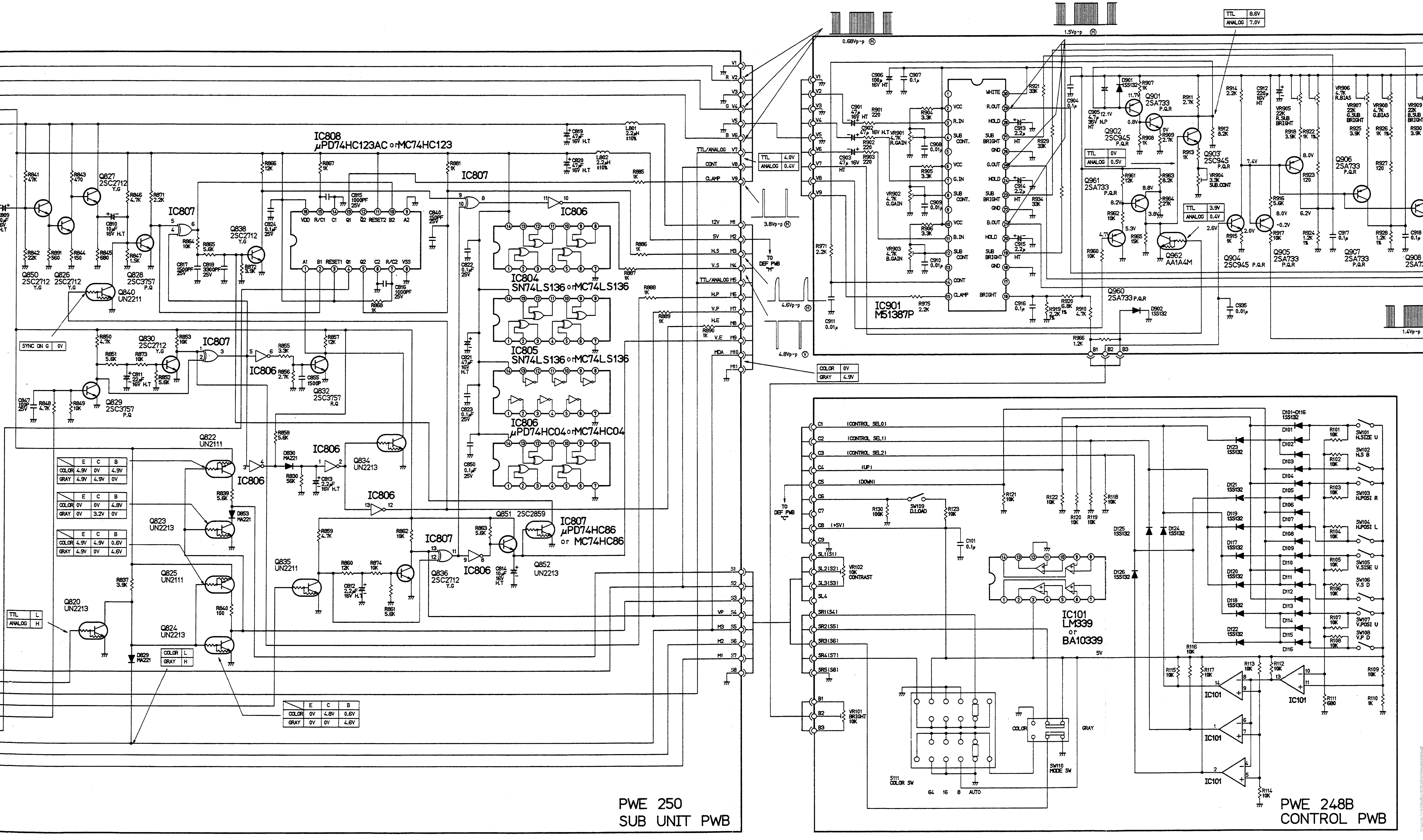

IC801 PCZ-80-40
IC802 SN74LS123 or MC74LS123
IC803 SN74LS367 or MC74LS367
IC804
IC805
IC806
IC807
IC808 μPD74HC123AC
RL801 G5AS-2 or G5A-237P
RL802 RY12W or G5AS-2 or G5A-237P
Q801 2SC2712 Y.G
Q802 UN2211
Q803 UN2219
Q806 2SC2002
Q807 UN2213
Q808 2SC2712 Y.G
Q809R 2SA1162 Y.G
Q810R 2SC3757 P.Q
Q811R 2SC3757 P.Q
Q812R UN2111
Q813R 2SC2712 Y.G
Q814R 2SC2712 Y.G
Q809G 2SA1162 Y.G
Q810G 2SC3757 P.Q
Q811G 2SC3757 P.Q
Q812G UN2111
Q813G 2SC2712 Y.G
Q814G 2SC2712 Y.G
Q809B 2SA1162 Y.G
Q810B 2SC3757 P.Q
Q811B 2SC3757 P.Q
Q812B UN2111
Q813B 2SC2712 Y.G
Q814B 2SC2712 Y.G
Q815 UN2219
Q816 UN2219
Q820 UN2213
Q822 UN2111
Q823 UN2213
Q824 UN2213
Q825 UN2111
Q826 2SC2712 Y.G
Q827 2SC2712 Y.G
Q828 2SC3757 P.Q
Q829 2SC3757 P.Q
Q830 2SC2712 Y.G
Q832 2SC3757 R.Q
Q834 UN2213
Q835 UN2211
Q838 2SC2712 Y.G
Q839 2SC2712 Y.G
Q840 UN2211
Q841 2SC2712 Y.G
Q842 2SC2712 Y.G
Q850 2SC2712 Y.G
D801 MA221
D802–D809 MA151WA
D810 MA221
D811–D818 MA151WK
ZD801 RD9.1HB
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10
A11
A12
A13
A14
5V
8.5V
12V
TTL 9.5V
ANALOG 0.1V
TTL 8.4V
ANALOG 0V
TTL 4.7V
ANALOG 0.2V
TTL 0.2V
ANALOG 4.6V
TTL 0.2V
ANALOG 3.9V
TTL 4.0V
ANALOG 0.4V
TTL 0.8V
ANALOG 2.4V
TTL L
ANALOG H
COLOR 0V
GRAY 4.9V
COLOR 8.4V
GRAY 6.5V
COLOR 0.6V
GRAY 8.4V
COLOR 5.4V
GRAY 0V
COLOR 1.6V
GRAY 4.9V
COLOR 7.1V
GRAY 5.8V
COLOR 2.1V
GRAY 4.1V
COLOR 4.8V
GRAY 0V
COLOR 2.2V
GRAY 0V
COLOR L
GRAY H
SYNC ON G 0V
RI1
RI2
GI1
GI2
BI1
BI2
M1
M2
M3
BLK
TEXT
INV
RO1
RO2
GO1
GO2
BO1
BO2
ENA
GND
+B
VCC
1R/C
1C EXT
1Q
2Q
2CLR
2B
2A
1A
1B
1CLR
2C EXT
2R/C
VDD
R/C1
C1
Q1
RESET2
RESET1
B1
A1
C2
R/C2

	E	C	B
COLOR	4.9V	0V	4.9V
GRAY	4.9V	4.9V	0V

	E	C	B
COLOR	0V	0V	4.8V
GRAY	0V	3.2V	0V

	E	C	B
COLOR	4.9V	4.9V	0.6V
GRAY	4.9V	0V	4.6V

	E	C	B
COLOR	0V	4.8V	0.6V
GRAY	0V	0V	4.6V


IC808
μPD74HC123AC or MC74HC123
IC807
μPD74HC86 or MC74HC86
IC806
μPD74HC04 or MC74HC04
IC804
SN74LS136 or MC74LS136
IC805
SN74LS136 or MC74LS136
IC901
M51387P
IC101
LM339 or BA10339
Q827 2SC2712 Y.G
Q850 2SC2712 Y.G
Q826 2SC2712 Y.G
Q828 2SC3757 P.Q
Q840 UN2211
Q838 2SC2712 Y.G
Q830 2SC2712 Y.G
Q829 2SC3757 P.Q
Q832 2SC3757 R.Q
Q822 UN2111
Q823 UN2213
Q825 UN2111
Q824 UN2213
Q820 UN2213
Q834 UN2213
Q835 UN2211
Q836 2SC2712 Y.G
Q851 2SC2859
Q852 UN2213
Q901 2SA733 P.Q.R
Q902 2SC945 P.Q.R
Q903 2SC945 P.Q.R
Q961 2SA733 P.Q.R
Q962 AA1A4M
Q960 2SA733 P.Q.R
Q904 2SC945 P.Q.R
Q905 2SA733 P.Q.R
Q906 2SA733 P.Q.R
Q907 2SA733 P.Q.R
Q908 2SA733 P.Q.R
SYNC ON G 0V
TTL L
ANALOG H
COLOR L
GRAY H
COLOR 0V
GRAY 4.9V
TTL 4.0V
ANALOG 0.4V
TTL 0V
ANALOG 0.5V
TTL 3.9V
ANALOG 0.4V
TTL 8.6V
ANALOG 7.0V
0.68Vp-p Ⓗ
1.5Vp-p Ⓗ
1.4Vp-p Ⓗ
3.8Vp-p Ⓗ
4.6Vp-p Ⓗ
4.8Vp-p Ⓥ
TO DEF PWB "H"
TO DEF PWB "C"
V1 V2 V3 V4 V5 V6 V7 V8 V9
TTL/ANALOG CONT CLAMP
12V 5V H.S V.S TTL/ANALOG H.P V.P H.E V.E MDA
H1 H2 H3 H4 H5 H6 H7 H8 H9 H10 H11
S1 S2 S3 VP S4 M3 S5 M2 S6 M1 S7 S8
C1 (CONTROL SEL0)
C2 (CONTROL SEL1)
C3 (CONTROL SEL2)
C4 (UP)
C5 (DOWN)
C6 C7 C8 (+5V) C9
SL1(S1) SL2(S2) SL3(S3) SL4
SR1(S4) SR2(S5) SR3(S6) SR4(S7) SR5(S8)
B1 B2 B3
VCC R.IN SUB CONT. G.IN B.IN CONT CLAMP
WHITE R.OUT HOLD SUB BRIGHT GND G.OUT B.OUT BRIGHT
VR901 4.7K R.GAIN
VR902 4.7K G.GAIN
VR903 4.7K B.GAIN
VR904 3.3K SUB.CONT
VR905 22K R.SUB BRIGHT
VR906 4.7K R.BIAS
VR907 22K G.SUB BRIGHT
VR908 4.7K G.BIAS
VR909 22K B.SUB BRIGHT
VR910 4.7K B.BIAS
VR101 10K BRIGHT
VR102 10K CONTRAST
SW101 H.SIZE U
SW102 H.S B
SW103 H.POSI R
SW104 H.POSI L
SW105 V.SISE U
SW106 V.S D
SW107 V.POSI U
SW108 V.P D
SW109 D.LOAD
SW110 MODE SW
S111 COLOR SW
64 16 8 AUTO
COLOR GRAY
D101~D116 1SS132
5V
PWE 250
SUB UNIT PWB
PWE 248B
CONTROL PWB

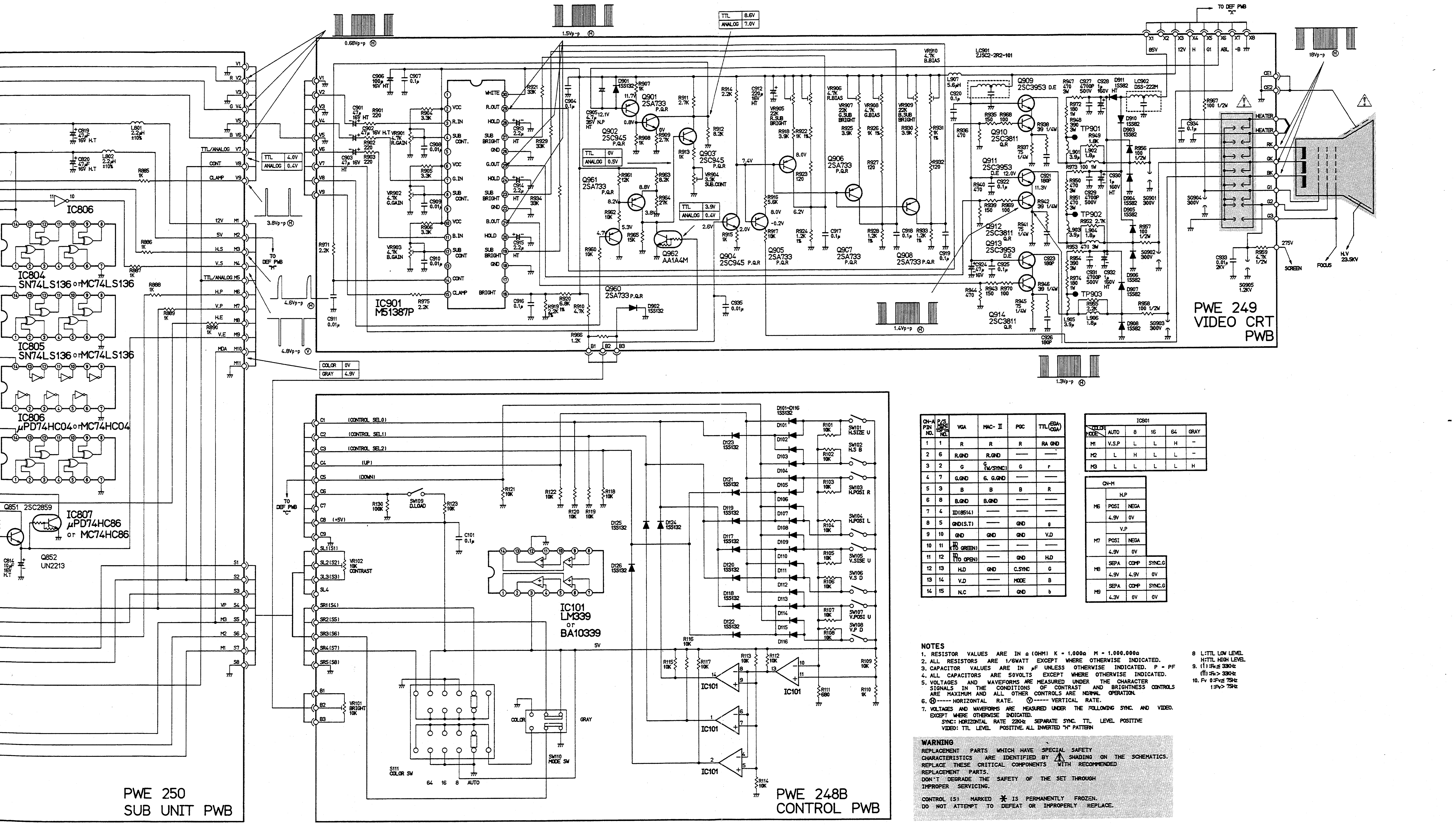
CN-A PIN NO.	P/S MINI 15Pin NO.	VG
1	1	R
2	6	R.GN
3	2	G
4	7	G.GN
5	3	B
6	8	B.GN
7	4	ID(8
8	5	GND(
9	10	GND
10	11	ID (TO G
11	12	ID (TO
12	13	H.D
13	14	V.D
14	15	N.C

NOTES
1. RESISTOR
2. ALL RESIS
3. CAPACITOR
4. ALL CAPAC
5. VOLTAGES
SIGNALS I
ARE MAXIM
6. Ⓗ----- HORI
7. VOLTAGES AN
EXCEPT WHER
SYNC: HO
VIDEO: T

WARNING
REPLACEMENT
CHARACTERISTI
REPLACE THES
REPLACEMENT
DON'T DEGRA
IMPROPER SE

CONTROL (S)
DO NOT ATTE

RUN NO.1


PWE 250
SUB UNIT PWB
PWE 248B
CONTROL PWB
PWE 249
VIDEO CRT
PWB
IC901
M51387P
IC804
SN74LS136 or MC74LS136
IC805
SN74LS136 or MC74LS136
IC806
μPD74HC04 or MC74HC04
IC807
μPD74HC86
or MC74HC86
IC101
LM339
or
BA10339
Q851 2SC2859
Q852
UN2213
Q901 2SA733
Q902 2SC945
Q903 2SC945
Q904 2SC945
Q905 2SA733
Q906 2SA733
Q907 2SA733
Q908 2SA733
Q909 2SC3953
Q910 2SC3811
Q911 2SC3953
Q912 2SC3811
Q913 2SC3953
Q914 2SC3811
Q960 2SA733
Q961 2SA733
Q962 AA1A4M
TO DEF PWB "A"
TO DEF PWB "B"
TO DEF PWB "C"
0.68Vp-p Ⓗ
1.5Vp-p Ⓗ
18Vp-p Ⓗ
3.8Vp-p Ⓗ
4.6Vp-p Ⓗ
4.8Vp-p Ⓥ
1.4Vp-p Ⓗ
1.3Vp-p Ⓗ
H.V 23.5KV
FOCUS
SCREEN
HEATER
SW101 H.SIZE U
SW102 H.S B
SW103 H.POSI R
SW104 H.POSI L
SW105 V.SISE U
SW106 V.S D
SW107 V.POSI U
SW108 V.P D
SW109 D.LOAD
SW110 MODE SW
S111 COLOR SW
64 16 8 AUTO
VR101 BRIGHT 10K
VR102 10K CONTRAST
TTL 8.6V
ANALOG 7.0V
COLOR 0V
GRAY 4.9V

CN-A PIN NO.	P/S MINI 15Pin NO.	VGA	MAC- II	PGC	TTL (EGA/CGA)
1	1	R	R	R	RA GND
2	6	R.GND	R.GND	——	——
3	2	G	G (W/SYNC)	G	r
4	7	G.GND	6. G.GND	——	——
5	3	B	B	B	R
6	8	B.GND	B.GND	——	——
7	4	ID(8514)	——	——	——
8	5	GND(S.T)	——	GND	g
9	10	GND	GND	GND	V.D
10	11	ID (TO GREEN)	——	——	——
11	12	ID (TO OPEN)	——	GND	H.D
12	13	H.D	GND	C.SYNC	G
13	14	V.D	——	MODE	B
14	15	N.C	——	GND	b

IC801					
COLOR / MODE	AUTO	8	16	64	GRAY
M1	V.S.P	L	L	H	-
M2	L	H	L	L	-
M3	L	L	L	L	H

CN-M			
M6	H.P		
	POSI	NEGA	
	4.9V	0V	
M7	V.P		
	POSI	NEGA	
	4.9V	0V	
M8	SEPA	COMP	SYNC.G
	4.9V	4.9V	0V
M9	SEPA	COMP	SYNC.G
	4.3V	0V	0V

NOTES

1. RESISTOR VALUES ARE IN Ω (OHM) K = 1.000Ω M = 1.000.000Ω
2. ALL RESISTORS ARE 1/6WATT EXCEPT WHERE OTHERWISE INDICATED.
3. CAPACITOR VALUES ARE IN μF UNLESS OTHERWISE INDICATED. P = PF
4. ALL CAPACITORS ARE 50VOLTS EXCEPT WHERE OTHERWISE INDICATED.
5. VOLTAGES AND WAVEFORMS ARE MEASURED UNDER THE CHARACTER SIGNALS IN THE CONDITIONS OF CONTRAST AND BRIGHTNESS CONTROLS ARE MAXIMUM AND ALL OTHER CONTROLS ARE NORMAL OPERATION.
6. Ⓗ----- HORIZONTAL RATE. Ⓥ----- VERTICAL RATE.
7. VOLTAGES AND WAVEFORMS ARE MEASURED UNDER THE FOLLOWING SYNC. AND VIDEO. EXCEPT WHERE OTHERWISE INDICATED.
   SYNC: HORIZONTAL RATE 22KHz SEPARATE SYNC. TTL LEVEL POSITIVE
   VIDEO: TTL LEVEL POSITIVE. ALL INVERTED "H" PATTERN
8. L:TTL LOW LEVEL
   H:TTL HIGH LEVEL
9. (I) :$F_H \leq$ 33KHz
   (II) :$F_H >$ 33KHz
10. Fv 0:$F_V \leq$ 75Hz
    1:$F_V >$ 75Hz

WARNING

REPLACEMENT PARTS WHICH HAVE SPECIAL SAFETY CHARACTERISTICS ARE IDENTIFIED BY ⚠ SHADING ON THE SCHEMATICS. REPLACE THESE CRITICAL COMPONENTS WITH RECOMMENDED REPLACEMENT PARTS.
DON'T DEGRADE THE SAFETY OF THE SET THROUGH IMPROPER SERVICING.

CONTROL (S) MARKED ✱ IS PERMANENTLY FROZEN.
DO NOT ATTEMPT TO DEFEAT OR IMPROPERLY REPLACE.